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A YEARLY REPORT OF THE PROGRESS OF THE GENERAL SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY

CHARLES E. SAJOUS, M.D.,

AND

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ASSISTED BY

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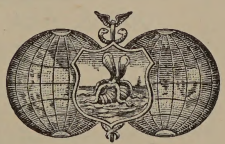

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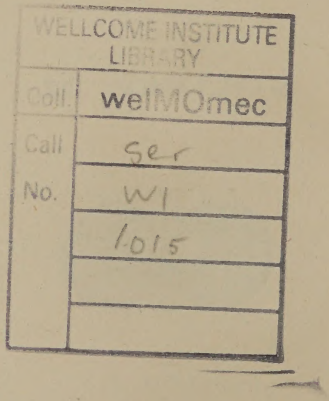

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SURGERY OF THE BRAIN, SPINAL CORD, AND NERVES.

By LEWIS S. PILCHER, A.M., M.D.,
BROOKLYN,
AND
SAMUEL LLOYD, B.Sc., M.D.,
NEW YORK.

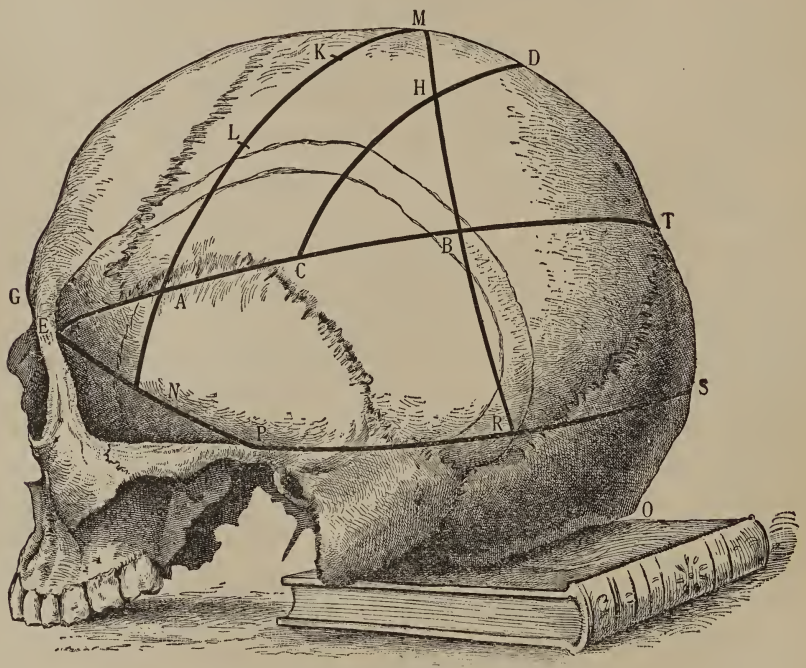
SURGERY OF THE BRAIN.

GENERAL CONSIDERATIONS.

Cerebral Localization.—Chiene, of Edinburgh, $\frac{36}{\text{June,'94}}$ states that, in addition to the motor areas around the fissure of Rolando, operating surgeons should be familiar with the relations of the temporo-sphenoidal lobe in connection with ear disease, the supra-marginal convolutions in puncture of the lateral ventricle, the angular convolution in word-blindness, the occipital lobe in lesions of sight,—in fact, the relations of the whole brain, except the anterior extremities of the parietal lobes. He suggests the following method of cerebral localization: Shave the head and find, in the median line of the skull, between the glabella (*G*) and the external occipital protuberance (*O*), the following points: The mid-point (*M*), the three-fourths point (*T*), and the seven-eighths point (*S*). Find also the external angular process (*E*) and the root of the zygoma (*P*) immediately above and in front of the external auditory meatus. Having found these five points, join *E P*, *P S*, and *E T*. Bisect *E P* and *P S* at *N* and *R*; also bisect *A B* at *C* and draw *C D* parallel to *A M*. The pentagon (*A C B R P N*) corresponds to the temporo-sphenoidal lobe, with the exception of its apex, which is a little in front of *N*. *M D C A* corresponds to the Rolandic area containing the fissure of Rolando, the ascending frontal and the ascending parietal convolutions. *A* is over the anterior branch of the middle meningeal artery and the bifurcation of the Sylvian fissure; *A C* follows its horizontal limb. The lateral sinus at its highest point touches the line *P S* at *R*. *M A* corresponds to the precentral sulcus, and, if it be trisected at *K* and *L*, these points

will correspond to the origins of the superior and inferior frontal sulci. The supramarginal convolution lies in the triangle *H B C*. The angular gyrus is at *B*.

Cathcart, in the discussion following Chiene's paper before the Medico-Chirurgical Society of Edinburgh, also demonstrated a method of cerebral localization requiring only one measurement, that locating the upper end of the fissure of Rolando, which, according to Thane, is half an inch behind the mid-point of a line

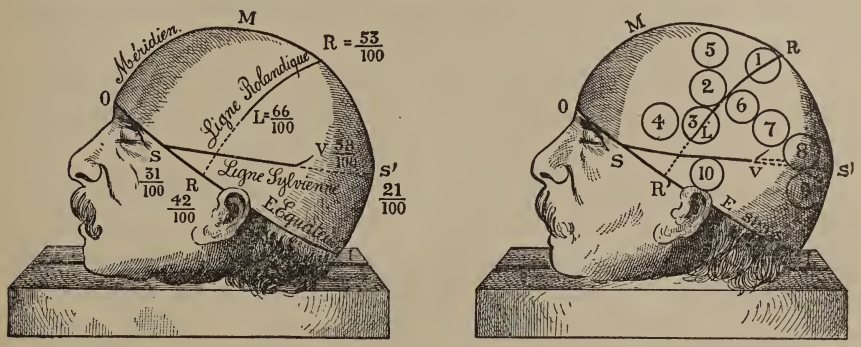


Cerebral Localization. (Chiene.)
Edinburgh Medical Journal.

extending from the glabellum to the external occipital protuberance. A line drawn from this point to the zygomatic tubercle gives the direction of the fissure of Rolando. A vertical line from the zygomatic tubercle strikes the fissure of Sylvius at the point where its vertical branch begins to show on the surface. The position of the fissure of Sylvius can always be ascertained on the dried skull by holding it up to the light, as there is a natural ridge of bone corresponding to it on the inner side. Starting one and one-half inches behind the external angular process of the

frontal bone, the first part of the fissure of Sylvius runs upward and backward parallel to the lower border of the zygoma as far as the mastoid process. Behind that its position is very variable. The parallel fissure can be marked out parallel to the fissure of Sylvius and an inch below it. The fissures of the frontal lobe run at equal distances a little in front of the fissure of Rolando. The lower part of the temporo-sphenoidal lobe runs parallel to the zygomatic arch, and this line continued backward hits the upper part of the lateral sinus. The position of the middle meningeal artery, before it spreads out, corresponds nearly to the place where the vertical portion of the fissure of Sylvius begins.

Masse, of Bordeaux, $\frac{70}{\text{Sept. 16, '94}}$ publishes an elaborate paper on



Method of Establishing the Exact Situation of the Fissures of Rolando and Sylvius. (Masse.)

Gazette Hebdomadaire des Sciences Médicale de Bordeaux.

"Cranio-encephalic Topography of the Ventricles of the Brain," which should be read in the original. He employs a special method of "autogravure" applied to the head of the cadaver to trace the lines corresponding to the Rolandic and Sylvian fissures. He then determines the relation of these lines to two main guide lines—the one medio-cranial, the other horizontal—to which he proposes to apply the term "cranial equator." These two main lines give the latitude and longitude, so to speak, of the cranium, and the position of the Rolandic and Sylvian lines in relation to them can be determined with almost mathematical accuracy; he has, in fact, calculated the fractional numbers which expressed the relation which constantly existed between these lines and the segments of the circle which cut them. He has tested his calcu-

lations on many heads, the measurements being made with a metal tape, and the results had always coincided.

Troje, [336 Aug.4,'94] from the history of three cases, concludes that there are cortical centres for the rectum and bladder in connection with the motor zones, probably in the near vicinity of the central sulcus. He also suggests the possibility of a centre for salivation in the anterior part of the brain, probably in the frontal lobes, in man. This theory is supported by the salivation seen in microcephalics.

Bianchi [336 July 7,'94] has studied the functions of the frontal lobes, and found that, in dogs and monkeys, after the removal of the prefrontal lobes, there was excitement, running about without object, and indifference. Inclination to associate with other animals was lost and sexual power was diminished. The animals became timid and gluttonous.

Gabritschewsky [586 No.52,'93; 21 May 19,'94] has made an examination of the power of the skull to transmit sound for diagnostic purposes, and claims priority in the application of this method.

McGee [764 Jan.,Feb.,'94] publishes an interesting study of primitive trephining, illustrated by the Muñez Peruvian Collection exhibited at the World's Congress of Anthropology held in connection with the Columbian Exposition at Chicago. His conclusions are that the operation was done ante-mortem, since five out of nineteen individuals had certainly, and two or three more probably, survived one or more operations. The trephining was surgical, was used in a medical way to relieve a general pathological condition, and was essentially prehistoric,—anterior to the Spanish invasion. This last point was indicated by the total absence of marks of metallic instruments.

TUMORS.

An editorial article [80 Feb.15,'94] on the surgical treatment of cerebral tumors gives a *résumé* of the later views on this subject. Horsley considers that operative interference is never more urgently called for than in certain cases of brain-tumor. In the absence of localizing symptoms, however, operation is not to be considered. The localizing symptoms consist in attacks of Jacksonian epilepsy, local contractions, or local auræ. As pressure becomes more marked, paralysis develops, either of motion or sensation, often somewhat sharply localized at first, but progressive in character.

As corroborating symptoms, headache, vomiting, and optic neuritis are usually observed, though the presence of any or all of these last symptoms is by no means necessary for a positive diagnosis, the progressive character of the symptoms indicating the nature of the lesion more clearly than any other single feature of the case.

He considers six weeks to be as long as can be expended in treatment by drugs, unless a striking improvement occurs. Starr, however, considers that three months may be devoted to this treatment, but only when, during this time, there is no rapid increase in the symptoms. In his tabulation of 81 cases treated surgically, 54 tumors were successfully located and removed,—39 patients recovered and 15 died. This alone justifies operation. Only gumma and tubercle are amenable to medicinal treatment, although all tumors may show slight temporary improvement under the influence of iodide of potassium. One should not, therefore, be led to postpone operation until too late because of this apparent improvement. Even though the tumor cannot be removed, and hence definite cure cannot be accomplished, operation holds out prospects of alleviation of suffering which more than justifies it. Trephining often serves to immediately and permanently relieve the agonizing headache and to put a stop to optic neuritis. The vomiting is often immediately relieved by opening the skull, while sometimes the epileptiform attacks cease, and paralysis may be partially or completely overcome. Horsley has related one case in which, at operation, an inoperable tumor was found, yet the patient lived more than two years, and the autopsy showed that the tumor had undergone complete destruction in consequence of exposure at the time of operation. He objects to the hammer and chisel in raising a large flap consisting of both bone and soft parts. For the former he uses a special pattern of mechanical saw and powerful bone-forceps. In his earlier operations many of the patients died of shock, but he now avoids that by doing the operation in two stages. First, he exposes the skull and removes the bone, then closes the wound and allows the patient to recover. In the second stage he raises this skin flap, opens the dura and operates on the tumor, packing the cavity left after its removal. Macewen also operates in two stages. When large areas of the brain are exposed, it is well to

preserve the contour of the cranium by replacing the whole piece of removed bone, which, in order to avoid the danger of necrosis and to provide for drainage, is changed into a mere lattice of bone by drilling it full of holes, each measuring one-fourth of an inch in diameter.

Keen $_{\text{Jan.,'94}}^{5}$ reports four cases, in three of which operation was performed. Relief followed in two cases, but eventually all the patients died. The first was an intra-cranial tumor, probably in the occipital lobe, in a man aged 31. No tumor was found at the operation, but after careful exploration with a grooved director it was concluded that one was present about an inch and a half below the cortex, but that it was too large to be removed. Much relief both to the headache and mental hallucinations followed. Death occurred at the end of four and a half months. The second case was a gliosarcoma of the upper part of the motor area; localization could be made very accurately, but, on account of the probable size and position and the condition of the patient, operation was not undertaken. Complete details of the other two cases are reserved for future publication. In one the tumor was erroneously diagnosed and the operation for its removal was fatal, and in the last case the tumor could not be made out at the operation, though it was found in the suspected position at the autopsy; the operation in this case, while it could not have afforded relief, did no harm. In the course of the article Keen remarks that inoperable tumors should be meddled with as little as possible. The amount of the bulging of the brain is a valuable indication of the size of the tumor. In cases where the growth is below the cortex, he suggests making an incision through the healthy brain-tissue one or two inches long and an inch deep, drawing apart the edges and examining to see whether there is anything abnormal beneath the cortex. He has never done this, but will certainly do it at the first opportunity.

Annandale, of Edinburgh, $_{\text{Apr.,'94}}^{36}$ remarks that sooner or later a growth inside the skull gives rise to symptoms the nature of which depends upon the position of the tumor, the amount of brain-pressure which it causes, and upon the presence of hæmorrhage or effusion caused by it. Experience in connection with intra-cranial growths has proved that there is some uncertainty in regard to the exact diagnosis of a case; that, although localized symptoms may

point to its position, the nature of the tumor and its exact connection can only be accurately determined by means of an exploratory operation. If the tumor is circumscribed and can be removed, the result is likely to be satisfactory, more particularly when the growth belongs to the group in which malignant tendencies are slight. Where no localized symptoms exist, an exploratory operation may be performed in cases which point to the presence of an intra-cranial growth, provided that the symptoms have been unrelieved by a short course of general and special treatment should there be any suspicion of syphilis or tuberculosis.

Von Bramann, $^{19}_{\text{Feb.3,'94}}$ after reporting two successful cases, states that, of the growths of the cerebellum, those of the frontal and parietal lobes are, as a rule, the most and those of the temporal region the least frequent. If the tumor is located on one side, the eye of the same side will be affected. When located near to the tentorium cerebelli, the choked optic disc will occur in both eyes at the same time. When near the base of the frontal lobe, hæmorrhages or ecchymoses of the retina are observed. Occipital tumors near the tentorium cerebelli may give rise to choked disc on both sides, but the intensity of the attack may be unequal. In cases of tumors occurring at or near the temporal lobes choked disc occurs more rarely, unless in the case of a rapidly-growing one,—abscess. In the majority of such cases it is present on both sides. Circumscribed tumors which displace the brain-tissue will give rise to these changes more rapidly than the diffuse variety; should the primary location, however, be near a sinus (*sinus transversus*), the latter variety will at once give rise to the grave symptoms described.

Gattie $^{39}_{\text{May,'94}}$ exhibited a patient who had had a tumor of the brain removed three years before. On trephining, a soft, red tumor was removed, after which the symptoms gradually improved. Sweeney $^{105}_{\text{July 16,'94}}$ gives the clinical and post-mortem records of four tumors of the brain, two of them involving the under surface of the frontal lobes, one arising from the dura mater and the other apparently from the stroma of the brain-substance. One case was a cyst involving the posterior border of the post-central convolution near its middle, and absolute relief resulted from the operation. Steele $^{61}_{\text{Jan.27,'94}}$ reports the case of a man, 41 years of age, in whom a tumor of considerable size was found

extending down into the brain, and readily separated from it. It was located in the upper half of the fissure of Rolando, and was attached by a firm pedicle to the skull or falx cerebri, at the region of the superior longitudinal sinus. A large rent was made in the

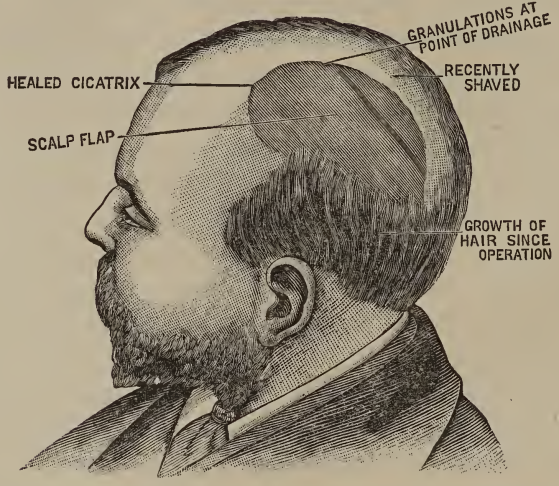


FIG. 1.—ENDOTHELIAL FIBROSARCOMA OF BRAIN. (STEELE.)
Appearance of operation wound at time of report.
Journal of the American Medical Association.

sinus on removing the pedicle; this was packed with iodoform gauze, as was also the whole intra-cranial wound. The tumor was an endothelial fibrosarcoma, weighing 60 grammes ($1\frac{3}{4}$ ounces). The patient is improving.

FIGS. 2 AND 3.—ENDOTHELIAL FIBROSARCOMA OF BRAIN. (STEELE.)
2. Base of tumor, showing depression at point of attachment. 3. Side view.
Journal of the American Medical Association.

Rose $\frac{22}{\text{Feb. 14, '94}}$ operated on a man, 56 years of age, who, six months before, had had a series of fits followed by transient right hemiplegia with aphasia, this in turn being followed by more or less dementia. There was some aphasia, double optic neuritis,

hemianopsia on looking to the right, and headache; local tension, tenderness, and bulging over the left parietal region. Trephining over the tender spot revealed a fungating tumor and a little purulent fluid. Total removal of the tumor was impossible. Microscopical examination showed the growth to be a sarcoma. The relief of the tension by the opening of the skull allowed of considerable improvement in the condition of the patient. Eskridge, of Denver, [61 Sept.30,'93] gives the history of a man, aged 50, with a syphilitic history, who showed symptoms of a tumor in the lower Rolandic region. There was Jacksonian epilepsy for a considerable time before the operation. The bone was found to be very thick and hard, the pia mater opaque and greatly thickened, so that the convolutions of the brain could not be seen through it, some portions being one-fourth to one-third of an inch in thickness. It proved to be a sarcoma of the pia and brain simulating brain-tumor. The patient died the third day after the operation. At the post-mortem the pia over the greater portion of the right frontal lobe, over the right Rolandic region, and over the right temporo-sphenoidal lobe laterally, appeared opaque and thickened and adherent to the brain-surface. Nixon [22 Nov.22,'93] reported the case of a man, aged 28, with a history of syphilis, who developed symptoms of compression and irritation of the brain. As he had had a suppurating sebaceous cyst over the right parietal eminence, with bare bone, intra-cranial suppuration was diagnosed. Trephining was done over the anterior extremity of the superior parietal lobule, just behind the upper extremity of the fissure of Rolando. Instead of an abscess, a hard cartilaginous substance was found dipping deeply into the brain and running forward across the fissure of Rolando, a portion being attached to the superior longitudinal sinus, from which it was removed with a Volkmann spoon. The neoplasm measured two by one and one-half inches. More than a month after the operation he was much improved, but suddenly began to have venous hæmorrhage from a small point of the hernia cerebri that had developed after the operation. He died from the loss of blood, and no autopsy was made.

Chiene [36 June,'94] says that in his experience the relief following the removal of tumors has been only temporary, but he has never yet had to deal with an encapsulated tumor. Riegner, of Breslau, [69 June 7,'94]

removed a tumor which involved the middle portion of the two central convolutions. The tumor was at first easily enucleated, but finally it was found extending deeply and increasing in size. In order to interfere as little as possible with the cerebral tissue, therefore, the growth was punctured and reduced in size by the evacuation of one and one-half tablespoonfuls of yellowish fluid. The tumor was so soft that it could not be removed *en masse*, and therefore was enucleated piecemeal. In size and shape it corresponded closely to a goose-egg, with its smaller end pointing toward the periphery. It proved to be a round-celled sarcoma. Twice a slight prolapse occurred, and once it was necessary to open the wound and evacuate some cerebro-spinal fluid that was causing pressure. After the wound had fully cicatrized the paralysis and sensory symptoms greatly improved, except in the forearm and hand, which are in the same condition as before operation. At the end of a month the visual power was much diminished. On the right side there was complete atrophy of the optic nerve, with narrowed arteries; on the left the papilla was white, not very sharply outlined, but somewhat grayish red on the nasal side. It was evident that the optic nerve on the side of the tumor suffered less from the intra-cranial pressure than the opposite nerve. The author says that this case justifies the conclusion that circumscribed, isolated tumors (sarcomata) give rise to an earlier and more marked choked disc than diffuse, infiltrated tumors (gliomata or abscesses). The former increase within the brain-tissue, pushing it aside, and thus increasing the intra-cranial pressure; the latter increase in size while the brain-tissue degenerates, and therefore the pressure is not so marked. Improvement in the forearm and hand could not have been expected in this case, as undoubtedly these centres had been completely destroyed by the disease.

Pel $\frac{4}{\text{Jan. 29, '94}}$ reports a case in which a tumor, the size of an egg, gave rise neither to headache nor eye-symptoms. In spite of this a diagnosis of tumor of the brain was made. The author explains this anomalous condition by the gradual growth of the mass allowing the brain to accommodate itself to its cramped quarters. Korteweg performed the operation, and found, under the dura on the left side, a chestnut-shaped mass, only adherent to the meninges at one point. It was easily enucleated, a deep

cavity being left. It was a benign, soft fibroid, traversed by large lymph-spaces originating in the pia. Death occurred from heart-failure soon after the operation. Another peculiarity of this case was that sensation was retained over the whole paralyzed area, although paræsthesia was the earliest symptom noted. This was probably due to the fact that the parietal lobes were intact.

Vierordt [34 July 24,'94] gives the history of a man, 23 years old, who developed Jacksonian epilepsy with left hemiparesis. A year and a half after the onset of the symptoms, under the impression that a glioma was the cause, an operation was performed, but the cortex was found normal. The patient continued to get worse and, in addition to the left hemiparesis, developed exophthalmos, stupor, and suspicious choked disc. In spite of the unfortunate outcome of the previous operation, another attempt was determined upon to locate the growth. Czerny operated and found a subcortical tubercle, weighing 200 grammes (6½ ounces), which was removed and the patient improved. It is important, judging from this case, in all explorations for cerebral growths, if they are not found on the cortex, to go into the subcortical region in order to find the tumor.

Springthorpe, of Melbourne, [285 Oct.15,'93] reports two cases of tumor, —one of sarcoma of the right motor area, with recurrence three months after its removal, and one of glioma of the right base, in which exploratory trephining was followed by death.

Echinococcous Cysts.—Esteves [1050 May,June,'94] reports the case of a man who developed an hydatid cyst in the motor region of the right side. This was successfully removed with the sac, and the patient recovered. There was an entire absence of papillar œdema and neuroretinitis. Codivilla [921 No.6,'94; 589 Mar.9,'94] also publishes the history of a young man, 24 years of age, who showed symptoms of cerebral pressure on the left side. A diagnosis of echinococcous cyst in the left motor region was made, and about 100 cubic centimetres (3¼ ounces) of fluid were evacuated. The recovery of function, though not complete, was quite decided. A more complete study of these cases is published by Mya and Codivilla. [319 Aug.18,'94]

Meningocele.—MacGillivray [285 Nov.15,'93] reports the case of an infant, 2 weeks old, with a large tumor on the occiput, with no distinct pedicle. It was immediately behind the occipital foramen. The skin over it was red, smooth, tightly stretched, and very thin.

The anterior fontanelle was more widely open than normal, and a faint wave of fluctuation could be transmitted to it from the tumor. The contents were almost entirely fluid, but a small part at the base seemed to be firmer. A few days after birth the tumor was so large that it was punctured with a trocar, giving exit to a considerable quantity of clear fluid. It rapidly refilled, and five days later was larger than ever. After several tappings the skin was divided by two curved incisions at the base and separated slightly from the meninges, which were then transfixed and cut off. A small portion of brain-tissue was taken away at the same time. [This would seem to class this case rather as one of hydrencephalocele than meningocele.—S. L.] The wound healed readily, but on the second day there was a little twitching and squinting, lasting for a few minutes. Sloan, of Dexter, Iowa, $^{61}_{\text{No.21,'98}}$ also reports the case of a female child which was found at birth to have a tumor in the occipital region, about the size of a small hen's egg, with a pedicle about one inch in diameter. It was covered with normal scalp. The pedicle was constricted by an Esmarch bandage and the growth cut away. The contents were entirely liquid. The tourniquet remained in place for twenty-four hours, but when it was removed there was a considerable escape of cerebro-spinal fluid. This was arrested by a continuous catgut suture.

Temoin $^{126}_{\text{July 15,'94}}$ describes the case of a child with an enormous tumor in the occipital region. The growth was small at birth, but grew steadily and became painful. It filled up the neck and covered the superior one-third of the bone, the skin being thin and marble-like. It was incised, and the pedicle, which was very large, was found to penetrate through an opening that corresponded to the posterior fontanelle. This, together with a small piece of brain-tissue attached by a small pedicle, was cut away and the membranes carefully sutured. The skin was also drawn across the wound and sutured. The cure was complete by the end of the twelfth day, and the child was still without sign of recurrence four months after the operation.

Denison, of New York, $^{814}_{\text{Jan.15,'94}}$ treated a case of traumatic meningocele which is of interest on account of the severity of the symptoms and their rapid disappearance after aspiration. A child, 11 months old, was injured by a fall, became unconscious, had cold

extremities, dilated pupils which did not respond readily to light, vomiting, feeble heart, and a large swelling over the right parietal bone, about one inch from the median line. There was no fracture and no laceration of the scalp. Ten days later bulging over the posterior fontanelle occurred, the left arm and leg becoming paralyzed, but not anæsthetic. The head also had to be supported constantly, as the child had no control of the muscles of the neck. There was no difference in the pupils, but the expression was dull and apathetic. Aspiration of the tumor in the posterior fontanelle was done under chloroform, and 6 ounces (186 cubic centimetres) were removed. Improvement followed within one week. A second puncture two weeks later drew off 3 ounces (93 cubic centimetres) of fluid. The improvement continued progressively, and there was marked increase in the intelligence. A third puncture, one month after the second, was made without chloroform, and only 45 minims (2.93 cubic centimetres) withdrawn. There was no return and the improvement was continuous. At the present time, two years after the first aspiration, she is perfectly well.

Mackie, of Elgin, $^{2}_{\text{Mar.10,'94}}$ delivered a female child with a tumor quite as large as its head attached to the occiput. On the third day, as it had begun to slough, operation was performed, a strong catgut ligature being passed through the centre of the pedicle, tied, and the growth cut away. It was found that some brain-substance was included in the ligature. This stump of brain-matter was pushed inside of the cranial cavity and sutures applied to close the scalp. Several convulsions occurred during the next twenty-four hours, but they soon disappeared and the wound cicatrized completely. Shortly after the end of the fifth week hydrocephalus supervened, causing death fifty-seven days after the operation. No post-mortem was allowed.

Muscatello, of Turin, $^{336}_{\text{July 7,'94}}$ after an elaborate study of congenital clefts of the skull and spinal column, concludes that transparencies in these tumors only mean that they contain fluid or fluid and brain-substance spread out equally. If, however, the brain-substance is collected at one point, there is not complete transparency, and in such cases we have to deal with an encephalo-cysto-meningocele. If there is a large skull-defect, a brain-hernia is probable. In cerebral herniæ in the occipital regions disturb-

ances of vision are of the utmost importance. In encephalo-cystocele excision is advised, the contra-indications being marked visual disturbances and the presence of other malformations. Meningoceles should be removed. In encephalo-cysto-meningoceles the tumor should be opened, the hernia reduced, and the scalp firmly closed across the opening. Myelomeningocele should not be operated upon. In uncomplicated myelocystocele removal may be undertaken. Tillmanns $_{\text{Dec.15,'93}}^{13}$ states that simple meningoceles are the most suitable for operation, either by puncture and compression or by incision and extirpation of the hernial sac. Most encephaloceles and all hydrencephaloceles are unsuitable for operation. The sac must always be carefully closed to prevent escape of the cerebro-spinal fluid.

Fenn, of Dover, $_{\text{Dec.2,'93}}^{2}$ delivered a child with a large occipital meningocele. The surface of the tumor soon began to ulcerate, and slight convulsions were noted. A pint ($\frac{1}{2}$ litre) of fluid was withdrawn with improvement. Two days later $\frac{1}{2}$ pint (250 cubic centimetres) was withdrawn, and again after two days one of the ulcerated spots gave way, discharging a considerable quantity of re-accumulated fluid. Following this, convulsions began again and death ensued when the child was 11 days old. At the autopsy a fissure was found on either side of the lower part of the occipital bone; that on the right side communicated with the sac and admitted the forefinger. The fissure on the left side was closed by membrane and apparently had no communication with the sac.

Hydrocephalus.—Pott $_{\text{July,'94}}^{51}$ reports the case of a boy, 3 months old, comatose, the circumference of whose head was 467 millimetres, with atrophy of both optic nerves, in whom puncture was performed in the occipital region and $\frac{3}{4}$ litre ($1\frac{1}{2}$ pints) of clear serum removed. The head was strapped and there were no immediate bad effects, but in two weeks the head was as large as ever. Ischernomor-Sadernowski $_{\text{July,'94}}^{51}$ made three punctures in a 4-month-old baby and removed 1135 cubic centimetres (over 2 pints) of fluid. There was slight temporary improvement, then Cheyne-Stokes respiration and death. In another case punctures at various times removed 444 cubic centimetres ($14\frac{1}{2}$ ounces) of fluid. Rachitis is considered as an important factor in the etiology of the disease, and rachitic changes in the blood-vessels, particu-

larly the veins, may cause stasis and transudation. Withdrawal of the fluid by means of several punctures, taking away small quantities, is preferable to removal of a large amount of fluid at one puncture. Baskett $_{\text{Jan.13,'94}}^{2}$ operated on a child 9 weeks old, tapping the head and drawing off about ½ pint (250 cubic centimetres) of fluid. A few days later he made an incision into the anterior fontanelle. There was temporary improvement, but finally the opening between the ventricles closed, and, although an attempt was made to relieve the pressure by opening the other side, the child died. Post-mortem a plug of purulent lymph was found in the dilated foramen of Monro. The infection had taken place during a period when the bandages were loosened and removed.

Parkin $_{\text{Nov.18,'93}}^{6}$ reports another successful case of continuous drainage through the under surface of the occipital bone (basal drainage).

Hern $_{\text{Nov.11,'93}}^{2}$ regards the condemnation of the operation of repeated tapping as unjustified, and reports six cases, all tapped more than once, of which four improved and two almost recovered. His conclusions are that the operation, if performed aseptically and the fluid drawn off slowly with the head well depressed, is not attended with the danger usually ascribed to it; that improvement usually follows the operation; and that, if done sufficiently early, there is some prospect of the child becoming a useful member of society. Lane, in the discussion of this paper, said that he had used interrupted and continuous drainage, the latter by a fine hypodermatic needle and hydraulic pressure extending over a considerable period, but the result, though temporarily mitigating the symptoms, was of no permanent benefit. Godlee had been much disappointed with the results of this method of treatment, not having had a successful case. Newman said that in most cases of hydrocephalus the veins of Galen were obstructed by pressure from without, and so the vessels of the choroid plexus became distended, and excessive exudation into the ventricles was the result. This led to increase in the intracranial pressure, to anæmia, and in some instances to atrophy of the brain. If the cause of obstruction could be removed a cure might be effected, but simply to draw off the exudation could only give temporary relief, for it was certain to re-accumulate.

Annandale, of Edinburgh, [36 Apr.,'94] considers that operative treatment in this condition is very unsatisfactory. He has seen no benefit in his cases. He questions whether an earlier operation might not prove more beneficial. Tillmanns [13 Dec.15,'93] advocates tapping and drainage of the lateral ventricles only to relieve pressure, and does not expect much permanent relief.

Frank, of Chicago, [96 Apr.,'94] reports two cases of tapping of the lateral ventricles,—one for hydrops ventriculi following a traumatism, the other for idiocy due to hydrops ventriculi following chronic inflammation of the ventricular lining, as a result of cerebro-spinal meningitis. Both cases were fatal. As a result of his study of these cases, Frank concludes that trephining and tapping the lateral ventricles are indicated for distension due to acute, simple, or tubercular meningitis, for effusion of blood into the ventricles from trauma or disease, for abscess involving the ventricles, for effusion from brain-tumors, and for chronic hydrocephalus, with moderate distension of the ventricles, without enlargement of the head; but if there is great distension of the ventricles with enlargement of the head, the operation would lead to a fatal result.

Microcephalus.—Blanc [228 Dec.15,'93; 22 Jan.10,'94] has performed craniectomy for microcephalus in three cases in which there was at first a constant amelioration of short duration; the agitation and the other symptoms then re-appeared, but diminished progressively. The most remarkable result was the decrease in the cries, agitation, attacks of mania, and convulsive crises, which disappeared or were notably diminished. The gait was markedly improved by the operation. The intellectual results were slower in showing themselves, but little by little the children became more attentive, more obedient, more affectionate, and susceptible to education. In his opinion, operation is simple, easy, not dangerous, and justified by the results.

Tillmanns, of Leipzig, [336 July 28,'94] does not consider the operation justifiable in the great majority of the cases, because there is almost always a congenital malformation of the brain which is not influenced by the ossification of the cranial bones. The growth of the brain is not impeded by the bones, but the cranium does not grow because there is too little cerebral development. Craniectomy is justified only in rare cases where there has been pre-

mature closure of the bone. He operated upon two cases, the first a boy $1\frac{1}{2}$ years of age, the second a girl of $2\frac{1}{2}$ years. The former was still living one year after the operation, but with no improvement; the other case died, eight and one-half weeks after the operation, of convulsions. The autopsy did not establish the cause of death. There had been no improvement. He operated by making a ⌊‾‾‾‾‾‾⌋ shaped skin-incision, placed so that the opening in the skull lay beyond the base of the skin-flap, and consequently covered by a well-applied skin-flap. This incision was from twelve to fourteen centimetres in length and made parallel to the longitudinal sinus.

Dumont, of Bern, $\frac{214}{\text{Dec.1,'93}}$ operated upon a girl, 14 months old, after the following method: A longitudinal incision was made from the forehead to the external occipital protuberance, along the sagittal suture, which is the least vascular region of the scalp. The scalp was raised from the bone, together with the periosteum. The raising of the periosteum was very easy, except at the sutures, where a raspatory was necessary. Somewhat below the parietal tuberosity, on both sides, an opening was made by a trephine two and one-half centimetres in diameter. From this opening a furrow, three to four millimetres in width, was cut in an horizontal line forward and backward. Luer's bone-forceps was employed for this part of the operation, and anteriorly and posteriorly, when, on account of the longitudinal sinus, the forceps could not be employed, a puncture-saw was used, the dural side being protected by a grooved sound. In this way the whole skull-cap could be moved. Hæmorrhage was slight, and the skin was pulled up and sutured without drainage. Two months after the operation the furrow in the bone was very marked and the skull-cap was still easily movable; strabismus was less marked. The epileptic attacks had ceased; the patient drank better and occasionally showed interest in her surroundings. The operation seems to be less bloody than the linear operation, and the desired diminution in pressure is obtained with certainty.

Murray, of Liverpool, $\frac{187}{\text{Jan.,'94}}$ calls attention to some of the dangers of the operation. He operated upon a microcephalic boy, 2 years and 8 months old, and the child died the following morning. The temperature rose to 104° F. (40° C.), and there was marked cyanosis with collapse. There was no septic

poisoning. Two deaths have been reported out of five cases,—one out of three by Keen, and one out of two by Horsley. In the latter the death was due to pyrexia. It may be that the heat and other centres, which, in an imperfectly-developed brain, are probably more unstable than usual, are unable to resist the unfavorable traumatic impression of the operation. Murray believes it is best to remove small portions of bone at a time, even a single disc, and repeat if the results are encouraging.

Binnie $^{96}_{\text{Apr.,'94}}$ reports one successful and one fatal operation for imbecility not accompanied by microcephalus. The first case developed the condition after an attack of meningitis, and death occurred, a few hours after the operation, from hyperpyrexia due to injury of the thermogenetic centres. In the second case the mental abnormality was due to maldevelopment of the cortex, and the operation was followed by much improvement. The child was less of a burden, and some capability for education was present.

Thomas, of Council Bluffs, Ia., $^{568}_{\text{Apr.,'94}}$ operated upon a girl 12½ months old, removing a furrow of bone on one side and fifteen days later a line of bone from the opposite side of the skull. After the first operation the eye upon the same side straightened, the opposite arm and leg began to be movable, and there was no spasm. After the second operation both eyes became straight and all the extremities could be moved. The expression changed and became more intelligent. The patient died of capillary bronchitis, but how long after the operation is not stated.

Jacobi $^{51}_{\text{June,'94}}$ read a paper before the Eleventh International Medical Congress in Rome, on the "Surgical Treatment of Idiocy and Microcephalus," giving statistics of 33 cases in which craniectomy was performed. In the 33 cases 41 operations were performed and 14 patients died. Most of the deaths occurred soon after the operation, 6 within a day. Some developed a very high temperature, others died of shock. The final results were: no history 1, uncertain 1, no improvement 7, slight improvement 7, some improvement 1, much improvement 2. While questioning whether the operation is justifiable at all, he expresses the opinion that the only cases likely to be amenable to treatment are instances of uncomplicated premature ossification of the sutures and fontanelles.

Parkhill [451 Nov.,'93] successfully operated upon a boy, 4 years and 8 months old, the improvement being most marked. The child grew physically, his development being "quite twice that of the average child under normal conditions." A second case was also operated upon, but the improvement was very slight. Fifty-two cases are on record, twelve dying,—23 per cent. In a large majority improvement has been noted, and in some it has been very great. Tausani [589 Dec.1,'93] also operated upon a case, but up to the time of the report there had been no improvement.

MENINGITIS.

Paget [6 Oct.7,'93] publishes a case of acute meningitis, in a boy 8 years of age, treated by drainage of the spinal cord. The arches of the fourth and fifth cervical vertebræ were removed according to Horsley's method. The dura was very tense, and did not pulsate; when it was punctured the fluid spurted up with great force in a high jet, till 4 or 5 ounces (125 to 155 cubic centimetres) had escaped. The dura was freely opened, a horsehair-drain inserted, and the wound closed around it. The pulse improved when the fluid was evacuated, but the pupils, which were widely dilated, did not change. The patient improved for a time, became conscious, but finally relapsed and died.

Ruth, of Keokuk, Iowa, [72 Oct.,'93] writes as follows: "The more I study the pathology of cerebro-spinal meningitis, the more I am convinced that it is essentially a surgical disease, and that, the earlier surgical aid is secured, the greater will be the chances of complete and permanent recovery. Operation should be undertaken before the exudation becomes plastic or purulent, and drainage established and maintained, if necessary, until the inflammatory action subsides."

Ord and Waterhouse [2 Mar.10,'94] report a case operated upon by the latter. The opening was made through the cerebellar fossa of the occipital bone, giving exit to a large quantity of fluid. A drainage-tube was left in and the wound was closed, the fragments of bone being replaced. The child did well. Walsham, in the discussion, said he had operated upon one case by cervical drainage, but the child died. Pasteur stated that drainage was the routine practice at the Middlesex Hospital, whenever there were symptoms of excessive intra-cranial pressure. The opening was made in the

lumbar region, which answered well enough, though, as the operation was not performed until the patient was comatose, the benefit was only temporary. Battle considered that earlier operation was essential, and that the drainage should be continuous.

ABSCESS.

Péan [22 Dec. 6, '93] presented a girl of 4 years, before the Académie de Médecine, who had received a bullet wound of the brain four months before. She had, as a consequence, complete loss of sight of the right eye, cephalalgia, fever, partial hemiplegia, and Jacksonian epilepsy. As soon as the meninges were incised, about 6 ounces (186 cubic centimetres) of pus escaped. The patient had steadily improved.

Brava [866 June, '94] presented a patient, before the Spanish Academy of Medicine, whom he had trephined in the right frontal region for a depressed fracture and resulting intra-meningeal abscess. The patient was a man, aged 24, injured by the explosion of a gun. Immediate unconsciousness, symptoms of cerebral compression, and evident cerebral contusion were present for from ten to fifteen days, when evidences of abscess appeared. A great quantity of pus was evacuated and a complete recovery ensued.

Chiene [36 June, '94] states that he was misled by the absence of all definite symptoms in a frontal abscess, and is of the opinion that the slowness of the pulse is an important symptom, while tenderness on percussion is not a guiding one. In cases pointing to temporo-sphenoidal abscess an early diagnostic incision should be made, and the exploration should first go in the direction of the roof of the petrous temporal and work forward if the eye-symptoms indicate pressure on either the third or sixth nerves or on the cavernous sinus, backward if there is an absence of eye-symptoms.

Von Hacker [57 June 17, '94] made an opening into the middle cavity of the cranium in a girl of 19 years, who had symptoms of abscess of the brain consecutive to an otitis media suppurativa. She had been operated upon previously by several aurists without success. The dura mater was bulging, pulseless, and of a greenish-gray color. Puncture evacuated a large quantity of cerebro-spinal fluid, but no pus. The condition began to improve at once, although the discharge from the ear was still present. Berlyn [32 Nov., '93] publishes the history of a case under the care of Barling. A child

3½ years of age had otitis media purulenta chronica, with cerebral symptoms. Opening the mastoid antrum did not relieve the condition and the child died. At the autopsy a considerable amount of pus oozed from near the tips of both temporo-sphenoidal lobes, and a large collection was found in both lateral ventricles. All three horns were much dilated, and their anteriors coated with a somewhat granular pyogenic layer. There was a considerable extension of pus through the iter into the fourth ventricle and from this to the cerebellum, the fourth ventricle being dilated.

Gifford, of Omaha, Neb., $^{106}_{\text{No.6,'93}}$ reports the case of a young man, 18 years of age, with chronic suppuration of the middle ear. Following insufflation of the ear, the discharge ceased, but he began to have intense headache, followed by chills. The antrum was opened and a moderate quantity of cholesteatomatous flakes, mixed with a very fetid discharge, was scraped away. He was much relieved for a time, but some headache persisted. The opening in the antrum was allowed to close and the symptoms promptly recurred. The opening was re-established and a quantity of clear, yellow, fetid pus escaped, but the symptoms continued and a painful swelling developed below the mastoid and for a short distance along the course of the internal jugular vein. About this time a copious discharge of very fetid pus occurred on two different occasions, containing much matter of a dirty, brownish-red color. It was finally concluded that there were thrombosis of the lateral sinus and cerebral abscess, and trephining was undertaken. The dura was thickened and did not pulsate. When pressed with a probe it gave way, and a large cavity, filled with very offensive greenish and reddish-brown pus, was discovered. The dural opening was enlarged in the direction of the cerebellum and more pus was evacuated. A severe hæmorrhage occurred at this time, necessitating packing between the cerebellum and bone. A whitish, membranous flake was then noticed protruding from the anterior extremity of the opening in the dura, which proved to be a pyogenic membrane large enough to surround a cavity the size of a small walnut. This was pulled out. The patient died apparently of pyæmia at the end of about one week. Autopsy showed nothing pathological in the cerebrum except a slight greenish discoloration of the surface of the gray substance at the posterior extremity of the temporal lobe, where

it came in contact with the dura mater, discolored by absorption from the thrombosed sinus beneath. A carious perforation opened from the mastoid into the cranial cavity about at the junction of the superior petrosal with the lateral sinus. The posterior surface of the petrosal bone in this neighborhood was carious, and the walls of the lateral sinus, nearly as far back as the torcular horophili, infiltrated with greenish-brown pus, and the sinus-cavity filled with fetid brown fluid. The superior and inferior petrosal sinuses and the branches in their immediate neighborhood were all filled with greenish-yellow thrombi. In the right anterior lobe of the cerebellum, separated from the petrosal bone by a layer of gray substance not more than two millimetres thick, there was an empty abscess-cavity, apparently recently evacuated, with walls of infiltrated cerebellar tissue, but with no pyogenic membrane that could be removed. The opening by which this cavity connected with the subdural space had either closed up or was too fine to be readily detected. The opening made in the skull at the time of the operation was found to be directly over the lateral sinus, the knife passing directly through both walls of the sinus and probably into the cerebellar abscess. Special attention is called to the reddish-brown discharge as diagnostic of suppurative thrombosis of the lateral sinus.

Harris, of East Dulwich, [6 Oct.14,'93] operated upon a case of thrombosis of the lateral sinus in a man, 35 years of age, who had had a severe attack of pneumonia followed by suppuration in the right ear. In a few days the symptoms pointed to thrombosis of the lateral sinus, and he was trephined. An hypodermatic needle was inserted into the sinus and some thick, purulent, sanguineous fluid was withdrawn. The sinus was then opened; some more of this fluid was evacuated, followed by a gush of venous blood. The hæmorrhage was easily checked by pressure. For four days hiccough was persistent. The recovery was uneventful. It is noticeable that the internal jugular was not ligatured in this case prior to the trephining. Cleghorn, of Blenheim, New Zealand, [557 Jan.,'94] also reports a case in a young woman, 17 years of age, who had had purulent otitis media of the left side for four years. As soon as symptoms of cerebral involvement supervened she was trephined at a point one inch behind the centre of the meatus and one-fourth of an inch above the base-line running through it. As soon as

the bone was perforated about 1 ounce (31 grammes) of fetid pus welled out and the lateral sinus was seen. Its external wall had sloughed and was adherent to the disc of bone that had been removed. A probe passed along the sinus for one inch toward the jugular vein and for one and one-half inches toward the torcula. The jugular vein was divided between two ligatures at the level of the omohyoid. The patient recovered.

Ballance [1077 Oct.4,'93; 2 Dec.9] operated successfully upon a case of lateral-sinus pyæmia, and he considers that each case of lateral-sinus pyæmia constitutes a grave surgical emergency; that no delay whatever is justifiable in the performance of the operation any more than in the event of hæmorrhage or of the strangulation of a hernia; and that the operation may be imperatively called for when there is no earache; when there is no otorrhœa; when the otorrhœa is inodorous; when there are no signs of inflammation over the mastoid; when the patient has not had a rigor; when the sinus is not thrombosed; or when secondary deposits are suspected or known to have taken place. Moreover, in all doubtful cases the path of safety is to be found in the tying of the vein and the artificial induction of thrombosis in the sinus. He also reports another case of lateral-sinus pyæmia, with operation and death at the end of two days; one of abscess of the cerebellum, with death one hour after the operation; and an abscess of the flocculus, in which exploratory examination did not reveal pus; the patient died seven days later.

Scheier [6 May 12,'94] operated on a young man of 19 years, with chronic middle-ear disease, who gave signs of cerebral abscess. An extensive pachymeningitis, but no abscess, was discovered. The temperature fell to normal, and the symptoms disappeared; but a week later he developed a condition of boulimia. A sudden discharge of pus soon occurred and a second operation revealed a bulging and pulseless dura, which was incised and an abscess the size of a hen's egg, in the inferior parietal convolution, was evacuated. The boulimia ceased immediately and the patient was soon perfectly well. Sänger [69 Jan.11,'94] reports a case operated upon by Wiesinger. About two tablespoonfuls of pus escaped from a point just above the ear. The cavity was washed out, but there was still a good deal of tension. Tube drainage was instituted and in the beginning a good deal of pus was evacuated. The

discharge continued for about two weeks, but ultimately the patient recovered.

Krönlein [214 Aug.1,'94] observed and operated upon a man, who had been injured five years before, over the right temporo-frontal region. Four years later an abscess developed in the scar, which was incised. Soon after this another fluctuating tumor developed, also under the scar, and this continued to increase. The whole wound was laid open and an opening in the skull was discovered in which there were several movable sequestra. The dura was discolored, pulseless, and tense. When it was incised a sloughing abscess, the size of a cherry, was discovered and evacuated. The result was very satisfactory. Mendelsohn and Tiling [21 Mar.3,'94] operated successfully upon a case of abscess in the region of the third frontal and anterior central convolution.

Kramer, of Glogau, [13 Aug.,'94] says that extra-dural abscess after disease of the temporal bone develops from an inflammation caused by suppuration or putrefactive microbes separating the bone and dura by a collection of pus. He reports two successful cases of operation. Joél, of Gotha, [41 June 14,'94] reports a case in which brain-symptoms appeared two and a half months after opening the mastoid. In a second case, two months after removal of the hammer and opening of the cupola, brain-symptoms developed. The mastoid, the drum-cavity, and the squamous portion of the temporal were opened, the dura being arched and tense, but no abscess being found. After eleven months the boy recovered.

Jansen, of Berlin, [41 June 14,'94] describes the cases of sinus thrombosis seen in Lucæ's clinic during 1893,—twelve in all. In two there was only putrefaction of the bulbus, in one there was thrombosis of the cavernous and petrosal sinus, and in the other nine the transverse sinus was affected six times, including the jugular vein and twice the cavernous sinus. Hausberg, of Dortmund, [41 Aug.23,'94] advises chiseling the mastoid in chronic suppurations, and then, if increased intra-cranial pressure is still present, opening the skull above the ear. To avoid injuring the lateral ventricle during the evacuation of pus, the knife should never be introduced deeper than three centimetres in this region. Exploratory punctures should be made to determine the situation of the abscess.

Swijascheninow [21 May 19,'94] collated all the operations on the skull in the surgical division of the Marien Hospital for the past seven

years,—1886 to 1893,—including 57 cases. The mastoid was trephined and scraped 49 times; in 45 fungo-suppurative osteomyelitis was present as a result of chronic middle-ear disease, in 3 there was caries of the occipital bone, and in 1 bilateral necrosis of the pyramidal and squamous portion; 5 of these 49 cases died.

Broca $\frac{5}{\text{Aug.,'94}}$ claims that in cases of chronic suppurative otitis media, accompanied with cerebral symptoms not well determinable, if there is a mastoid fistula or symptoms of mastoiditis, it is necessary to perform generous trepanation of the mastoid and of the tympanic cavity. The same thing should be done even when the mastoid region appears normal externally, for sometimes an unsuspected retention of pus will be found in it, which causes the symptoms, and also because, if it is necessary to go farther, the mastoid path is the best one.

Cases of operation are also reported by Burnett, $\frac{11}{\text{July,'94}}$ Terrillon, $\frac{5}{\text{Aug.,'94}}$ Brentano, $\frac{5}{\text{Aug.,'94}}$ Kretschmann, $\frac{5}{\text{Aug.,'94}}$ Polo, $\frac{5}{\text{Aug.,'94}}$ Stewart, $\frac{2}{\text{Dec.16,'93}}$ Hughlings-Jackson, $\frac{6}{\text{Feb.17,'94}}$ Jonas, $\frac{72}{\text{Mar.,'94}}$ Mason, $\frac{32}{\text{Dec.,'93}}$ and Johnson. $\frac{19}{\text{Jan.27,'94}}$

INTRA-CRANIAL HÆMORRHAGE.

In a discussion before the Philadelphia Neurological Society, on a paper read by Taylor, $\frac{242}{\text{May,'94}}$ on three fatal cases of trephining for middle meningeal hæmorrhage without fracture, Keen said that the difference in result between the operated and the non-operated cases has been studied by Wiesmann, who placed the mortality of the former at 89.1 per cent. and of the latter at 32.7 per cent. The mechanism of the tearing of these vessels was probably the same as that following a blow; there was a momentary separation of the dura from the bone, and the vessel was thus torn where it entered the bone. The most important point in making the diagnosis was the period of consciousness between the two periods of unconsciousness,—the primary stunning and the secondary coma. This period of consciousness should always lead to suspicion of rupture of the middle meningeal artery. The localizing symptoms fall into three groups: First, the motor symptoms,—*i.e.*, motor aphasia from pressure at the bottom,—then involvement of the face-, then of the arm-, and, rarely, unless the hæmorrhage be enormous, involvement of the leg- centres. The site of all operations should be determined not by the seat of the injury, but by the localizing symptoms. Second, the dilatation of

the pupils. [The third category is not given in the report. May it not be rise of temperature?—S. L.] A satisfactory and accurate diagnosis cannot be made between rupture of the middle meningeal and cerebral arteries, nor is it essential. Whether clot be inside or outside the dura is surgically of little moment. The control of hæmorrhage should, if possible, always be by ligature; when this is not possible, recourse must be had to packing.

Laplace reported a successful case, and said that he had always been averse to employing catgut to sew up the meninges, for fear of infection, and therefore preferred to use the finest Chinese silk, and had no reason to regret it.

Dercum considered that the symptoms in supra-dural hæmorrhage were clear, but both supra-dural and intra-dural hæmorrhage might give rise to difficulty when complicated with concussion. Such a case had been under his care. Although the symptoms seemed to point distinctly to one side, trephining in that side failed to reveal the clot, and the surgeon declined to go farther. At the autopsy an extensive subdural clot was discovered on the opposite side. Where the bleeding was diffuse, the mechanical difficulties might be overcome by making openings in the skull some distance apart and irrigating from one to the other. Where there were symptoms of cerebral concussion complicating those of fracture or hæmorrhage, trephining should be done with great rapidity, and, failing to find the source of the trouble on one side, the other should be trephined. The added number of openings in the skull can do no harm. Keen considered the period of consciousness of great value in deciding between concussion and hæmorrhage. In concussion there would not be that deep unconsciousness which is seen in secondary coma from pressure. In concussion the patient can usually be aroused by shaking or loud questioning; in the coma of compression this cannot be done. In concussion the pupils are usually equal and responsive to light; in compression from clot they are usually unequal, the one on the side of the pressure more or less dilated and very sluggish or not at all responsive to light. The rise of temperature which follows middle meningeal hæmorrhage is not usual in connection with concussion. Concussion will improve, hæmorrhage will grow worse. Hansell supposed the dilatation of the pupil to be due to paralysis of the optic nerve on the dilated side from pressure.

Dercum took exception to this explanation in regard to the dilatation of the pupils, for the fibres of the optic tract, which form part of the arc for the reflexes of the iris, go to one-half of each eye, and thus the retinæ of both eyes are equally deadened and there is slight dilatation of both pupils, never inequality. The nuclei of the oculo-motor nerves, which give origin to the fibres supplying the iris, are exceedingly delicate and react to very delicate and comparatively-slight impressions. In hæmorrhage we have a sudden increase of the intra-cranial pressure, and these delicate structures react readily to slight changes in pressure, and that is why we have the dilated pupils.

Relton, of Rugby, and Haslam, of Birmingham, $^{6}_{\text{Feb.24,'94}}$ report a successful case of trephining for hæmorrhage from a small branch of the middle meningeal artery, following a fissured fracture of the internal table of the skull caused by a blow from a cricket-ball. In this case, the pressure not being directly over the motor area, but over the angular gyrus and occipital lobe, the pressure on the brain interfered with the paths from the motor area through the posterior limb of the internal capsule, and unconsciousness preceded the paralysis by nearly three days.

Packard, of Philadelphia, $^{9}_{\text{Jan.13,'94}}$ trephined for extra-dural hæmorrhage in a man, 27 years of age, suffering from a fracture of the right parietal bone. The clot was removed and the patient recovered.

Giffen, of Lincoln, Neb., $^{9}_{\text{Oct.14,'93}}$ in the case of a man who was injured over the arm and leg centre in a brawl, cut holes in the skull, after the soft parts had been retracted, with a brad-awl such as carpenters use, in the line where the chisel was to be employed. He says: "It is surprising how rapidly one can use the awl and make the openings, which weaken the line of incision so much that the chiseling is not difficult, as the bone readily gives way between the points of opening. The middle meningeal artery was bleeding profusely, and was tied. There was a fracture of the inner table of the skull. Although the surroundings in this case were most filthy and antiseptic precautions were impossible, the man recovered without a single rise of temperature."

Irving, of Huddersfield, $^{2}_{\text{Jan.13,'94}}$ reports the case of a man who fell fifteen feet and became insensible to sound, but not to light or pain, on whom, after admission to the hospital, he operated over a

point of depression in the left temple. A large clot was found, and when it was removed the hæmorrhage was seen to come from several points, the chief being from a branch of the middle meningeal artery. The patient made a satisfactory recovery.

Stewart, of Hindmarsh, Adelaide, $^{267}_{\text{June 15,'94}}$ reports a case of hæmorrhage following a blow in the occipital region. There was a fracture extending from and involving the frontal bone across the anterior inferior angle of the parietal bone, and then on across the squamous portion of the temporal. An immense clot was found, all of which could not be removed; nevertheless the

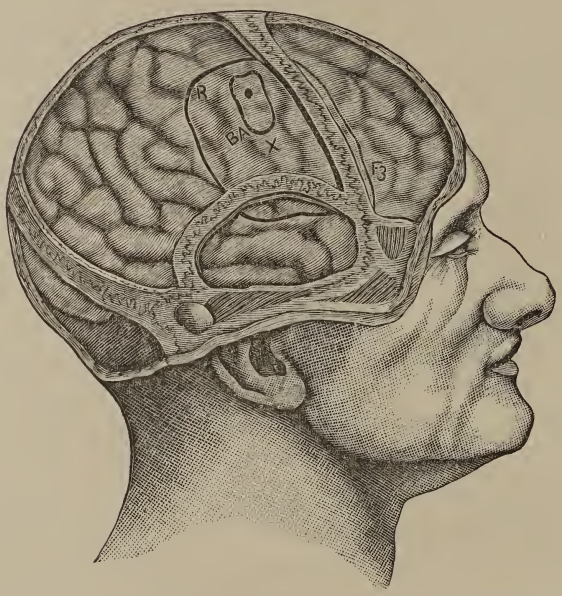


Fig. 1.—Endocranial Hæmorrhage, showing Location of Clot in Case I. (Hudson.)

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patient made an uninterrupted recovery. Rowlands, of Narromine, New South Wales, $^{267}_{\text{May 15,'94}}$ operated on a young man with symptoms of pressure over that portion of the motor area controlling the muscles of the side of the face and tongue. A clot was found under a fracture and removed. Recovery ensued. Mynter, of Buffalo, $^{96}_{\text{May,'94}}$ successfully trephined for subdural hæmorrhage, with aphasia and hemiplegia. Levy $^{589}_{\text{Feb.17,'94}}$ also reports a successful case.

Hudson, of Lafayette, Ala., $^{96}_{\text{Oct.,'93}}$ has within two years operated

upon two cases. The first was struck on the head and soon developed compression symptoms. A clot was found over the point shown in the illustration. (Fig. 1.) The hæmorrhage was from a branch of the ascending frontal artery. The patient was soon able to resume work. The second case was also one following an injury. There was partial word-blindness, with agraphic faults. An extra-dural hæmorrhage over the left side of the brain was removed. The greater part of the hæmorrhage was probably from the sinuses in the bone injured by the fracture. The patient recovered, showing no indication of the injury.

Fig. 2.—Endocranial Hæmorrhage, showing Location of Clot in Case II. (Hudson.)

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Harris, of East Dulwich, $^{6}_{\text{June 9,'94}}$ in a man of 43, with traumatic hæmorrhage into the brain, trephined over the left-arm centre, that being the point from which the explosion in his Jacksonian attacks occurred. The dura was dark-purplish in color, and when incised there was a spurt of dark, venous-looking blood, showing that some considerable tension had been relieved; this escaped from the centre of a large clot, conical in form, its apex pointing toward the centre of the brain, the outer layers being degenerated and beefy. The operation was done nineteen days after the

receipt of the injury, and recovery was uneventful. Reid [285 June 20,'94] reports a case in which suppuration resulted after the operation, but the patient recovered.

Dercum and Keen, of Philadelphia, [2025 May 30,'94] reported two cases of cerebral hæmorrhage treated by ligation of the common carotid, according to the method proposed by Horsley. In the discussion of their paper, Fry, of St. Louis, said that the important points to determine were, first, the fact of the hæmorrhage, and, second, its character. Knapp believed that most of these patients were seen too late. Operation should only be advised at the first symptoms of hæmorrhage, and then it might be of advantage. Dercum regarded it as especially indicated in cases of ingravescent hæmorrhage. Fontan [14 July 18,'94] ligated the middle meningeal and several other small arterial branches in a case of traumatism in the parietal region. In this case there were no motor symptoms, but rise of temperature some hours after the accident. The patient recovered.

Bramwell, of Edinburgh, [2089 '94; 36 June,'94] in his "Remarks on Intra-cranial Surgery," mentions that he has seen several cases in which he thought the relief of a rapidly-increasing intra-cranial pressure might possibly—for a time, at least—have warded off the fatal result; but he is doubtful if the cases in which the operation is likely to be successful are numerous. McCosh, [5 Mar.,'94] in a report of four cases of brain-surgery, gives the history of two cases of successful trephining for extra-dural hæmorrhage, and one of subdural hæmorrhage in a child of 6 years, probably due to a pachymeningitis hæmorrhagica.

CONCUSSION.

Lane, of San Francisco, [61 July 14,'94] and Bennett, of London, [1077 Apr. 4,'94] publish papers on this subject. The former, after a careful review of the literature, says that in the mildest grade there is a brief diminution of the blood-pressure in the part; its tension is temporarily lowered. If the violence is somewhat greater, then there is superadded to the former condition a disturbance of the cellular constituents composing the surface of the brain. A jostling or displacement of the molecular elements of these cells, even though it be microscopically minute, must suffice to induce functional derangement. If the violence is still greater, then, besides the

abolition of the thinking faculty, the cardio-pulmonary functions are disturbed, depending, doubtless, on the lesions of the centres at the base of the brain which preside over these functions. In the still-higher grade the functions of life permanently cease at once, or within a few minutes after the receipt of the violence. In treating these cases, where there is great depression, ammonia fumes to the nose, tickling of the nostrils, stimulants, brandy and warm water and black coffee per rectum, hot applications over the præcordia, and rubbing of the surface of the body are advised. In cases of great prostration life may be awakened by lowering the head, and, after sufficient recovery, remedies by the mouth may be given. Stimulants should be employed only during the period of depression, the inflammatory symptoms, which usually appear after a few days, being then controlled by proper measures. The stage of excitation begins about the eighth, ninth, or tenth day after the receipt of the injury. If a plethoric patient, bleeding from the arm should be tried, not less than 1 pint (500 cubic centimetres) of blood being taken. Ice may be applied to the head, all constrictions about the neck avoided, warmth applied to the lower extremities, and a purge administered. Iodide of potassium in 10-grain (0.65 gramme) doses every four hours for the adult, 3 grains (0.2 gramme) three to four times daily for a 4- to 5-year-old child, may be given, and restless somnolence may be controlled with bromide of potassium. Frequently, two or three months are required for the entire recovery of the patient, so that he can resume some occupation; and for a yet longer period limited exercise of the body and mind should be enjoined.

Bennett also divides cases of concussion into four classes: 1. Those in which loss of consciousness lasts for an hour and upward. 2. Those in which loss of consciousness lasts for from ten minutes to an hour. (These two classes go fairly well together, because they are both of a severe type.) 3. Those in which loss of consciousness extends from a few seconds to a few minutes. 4. Those in which there is no real loss of consciousness; this last class is the most important of all. In these last cases the patient is only conscious of a giddiness for a moment or two and then feels perfectly well. Some hours later, however, pain may develop, and this pain is invariably in the nape of the neck, exactly where the head joins the neck. In addition, these patients will have a

dazed, sometimes frightened look, and the one symptom which invariably exists is a characteristic peculiarity of the pulse, which is of the greatest possible importance. This pulse seems fairly good; it comes up quickly under the finger and feels sufficiently strong, but if the finger press it ever so lightly it is reduced to absolute nothingness; the slightest possible pressure stops it altogether; it is an extraordinarily compressible pulse. It has apparently a great deal of action, but really no power at all. Its rate is 70 to 100. In treatment, complete rest is indicated, with fluid diet, until the pulse is stronger and the expression normal. The patient should be kept in bed until his pulse has resumed its natural character.

According to Hutchinson $^{22}_{\text{Dec,20,'93}}$ there can be no doubt that a fatal result sometimes occurs in these cases. He has never made an autopsy on a concussion case without finding some lesion in the brain. Death may result from the effect of the concussion itself. The danger exists only in the early stages; if the patient survive twenty-four hours, recovery is likely to take place so far as the direct effects of the concussion are concerned.

INJURIES.

Hutchinson $^{22}_{\text{Dec.20,'93}}$ says that there are special dangers in cases of laceration of the brain, but in occasional instances the patients do recover, even when there have been symptoms of hemiplegia or other signs of loss of power. When hemiplegia occurs, followed by recovery, the laceration was probably only in the surface. Eccles, of London, $^{15}_{\text{June,'94}}$ states that the marked changes in body-temperature, often noted after injury to the head, may possibly be due to the absorption of fibrin-ferment from the extravasated blood, as is the case not infrequently in simple fracture of bones of the extremities. There can be no doubt that, in most, if not all, cases of high temperature subsequent to head-injury, there is some laceration of the brain-substance, often by *contrecoup*, and that this, rather than any injury to the bones, is the cause of the increase in body-heat.

Binnie, of Kansas City, Mo., $^{72}_{\text{Jan.,'94}}$ says that every case of depressed fracture of the skull, whether great or small, comminuted or non-comminuted, with symptoms or without, ought to be trephined, possibly excepting fractures over the frontal antrum or the

longitudinal sinus. Every case of localized injury to the skull, with symptoms of compression, in the absence of definite localizing signs, should be trephined at the seat of the injury; and if nothing be discovered there, then, if possible—and it is rarely possible—at the point where *contrecoup* may be expected to have acted. If localizing symptoms are present, they determine the point of operation. Every case of compound fracture of the skull should be explored by touch and vision; in every doubtful case exploration is justifiable.

Estes, of South Bethlehem, $^{9}_{\text{Mar.10,'94}}$ relates a case of fracture of the skull with laceration of the cerebrum in which a cup of gold-foil was fitted to permanently stop the outflow of cerebral tissue and close a hole in the membranes. This cup was made in the shape of a hollow cone, with a base just large enough to fit closely to the inner ring of the inner table of the cranial wound, and was about two centimetres in depth. It was fastened in place by being pressed to fit the indentations and irregularities of the rim of the inner table, some iodoform gauze being packed loosely within it. The scalp was then closed, except for a small spot in the centre, through which a small bit of the gauze projected. The wound healed throughout, and a month later there was absolutely no indication of any cerebral trouble.

Lawrence, of Columbus, Ohio, $^{233}_{\text{Nov.,'93}}$ advises the use of the trephine in injuries of the brain. Coleman, of Colorado, Texas, $^{2013}_{\text{May 2-5,'93}}$ reports a case of fracture of the skull in which operation had not been performed by the physician in attendance at the time of the injury. When he saw the case, three months later, there were signs of a cerebral abscess. Examination revealed that a piece of bone, two inches long by one inch wide, had been fractured and turned at right angles upon its proper axis. It was partially united by bone, and had penetrated the brain just over the second and third frontal convolutions of the left hemisphere. It is interesting to note that, while this is looked upon as the so-called "blind area,"—that is, the area in which the symptoms are not usually distinctive,—there was partial hemiplegia of the opposite side and some paralysis of speech.

Kehr $^{336}_{\text{No.48,'93}}$; $^{2}_{\text{Dec.30,'93}}$ closed a large opening in the vault of the cranium by transplantation of a disc of bone composed only of the outer table of the skull. This disc was removed by the chisel

from the diploë at a part of the parietal bone close to the outer portion of the defect, and remained attached to the surface of the cranium by a broad bridge of skin and pericranium at its posterior part.

Ballantyne communicated a paper by Jennings, of New York, to the Edinburgh Obstetrical Society, on the operative treatment of cranial depressions in the newborn infant. [36 Apr.,'94] He details the case of an infant that had just been delivered by forceps, leaving a marked depression in the left frontal bone. There were no symptoms, and operation was delayed; but forty hours after birth, the rest of the head having assumed its normal proportions with no improvement in the depression, a button of bone was removed at this point. The child did well, and Ballantyne remarked that he believed the treatment to have been justified. He had dissected several still-born infants with cranial depressions, and had found meningeal hæmorrhage under the site of the depression.

Cole, of New York, [81 Nov.,'93] read a paper on depressed fractures of the skull, a clinical study, with a report of 40 operative cases at Chambers Street Hospital, in the service of L. A. Stimson, before the Medical Society of Virginia. Only one of the cases had died, and this death had been due to hernia cerebri. The trephine had only been employed in 4 cases, and symptoms were absent in 15, possibly in several more. Anæsthesia had not been used in 6 cases; cocaine was employed in 1 and ether in the remainder. The fact that thirteen operators had achieved practically the same results encouraged the belief that an immediate determination of the exact conditions present, by an incision if necessary, with the immediate elevation of depressed bone and the removal of completely-detached pieces, if small, and drainage, were not only easy, but practically obligatory.

Segond [14 June 10,'94; 15 Sept.,'94] reports a case trephined by Verchère. The patient was a 7-year-old child with a fracture of the skull which had occurred two months before and had produced epileptiform attacks. There was depressed area and a small fragment of bone was found imbedded in the brain. The anterior branch of the middle meningeal artery was wounded, and was controlled by packing with iodoform gauze. When this was removed a small portion of cortex was removed with it. Fifteen months later the child was in perfect health. Lucas-Championnière suggested

using catgut to plug the wound instead of iodoform gauze, in cases of hæmorrhage, as this can be left behind and allowed to absorb. He thought children bore this operation better than adults, in whom sclerosis supervened, especially when interference took place late.

Twynam, of Sydney, N. S. W., $^{6}_{\text{May 26,'94}}$ observed a case of fracture of the skull, with paralysis on the same side as the lesion. The seat of the injury was directly above and partly behind the right ear; and a depressed fracture, suggesting, by its size and shape, that half a tennis-ball had been driven into the skull, was made out. Two pieces of bone were removed and recovery was complete. The left side of the skull was carefully examined, but no injury could be discovered. The symptoms pointed to an injury by *contrecoup*, but nothing could be seen externally.

Thorne, of London, Eng., $^{77}_{\text{Aug.,'94}}$ reports a case operated upon by Robinson. A man, 44 years of age, was struck on the head and had complete paraplegia below the neck. Four and one-half months after the accident he was admitted to the hospital. He had a depression along the sagittal suture three inches in length and two in breadth, with profuse oozing from the diploë. All efforts to raise the depressed bone were useless, and it was cut away. There was a sharp spine on the last piece of bone removed, which injured the longitudinal sinus. Hæmorrhage was profuse. A curved needle, armed with silk, was passed around the sinus above and below the rent and firmly tied. In spite of the loss of blood and the long time elapsing between the accident and the operation, the patient made an uneventful and complete recovery. Bird, of Melbourne, $^{285}_{\text{Dec.15,'93}}$ operated upon a girl, 8 years of age, for fracture of the skull. A square piece of parietal bone was found lying almost loose in blood-clot, and brain-matter exuded all round it; several other pieces of bone below the temporal ridge and considerable blood-clot and brain *débris* were taken away. There was a curved fracture, about an inch above the squamous suture, extending in front and apparently behind to the base; there was also a fracture leading from this at right angles; a large portion of the temporal fossa was depressed. The symptoms did not improve after this operation, and twenty-four hours later the wound was again opened and enlarged anteriorly, disclosing a large hole in the dura mater leading into the frontal

lobe, through which a portion of bone had been forced into the lobe, which was much lacerated and filled with broken-down, grumous brain-matter. The frontal lobe was cleaned out with the little finger and a scoop and a drainage-tube passed into the cavity. The child recovered very rapidly, and the question is raised whether the uninjured hemisphere may not have taken on double work, as repair could not possibly have taken place as efficiently and as quickly as the restoration of function would suggest. A second case had one side of the skull crushed in. The whole fracture was exposed by a linear incision and a trephine applied at the deepest point of the depression. Several large fragments making up the mastoid bone were then removed. One fragment was wedged tightly in the lateral sinus. When this piece of bone was removed the bleeding was profuse; in the sinus itself two other pieces of the mastoid had to be removed from within an inch of the torcula. While this was being done the hæmorrhage was alarming, and was controlled first by the little finger in the sinus and then by packing with iodoform gauze. The rent in the lateral sinus was over an inch long. This patient also recovered. The third case was a fracture followed by abscess, which was evacuated with prompt recovery. Marks, [568 Mar., '94] in reporting four cases of fracture of the skull, with recovery, advocates the use of the chisel instead of the trephine. In the discussion on his paper the usual difference of opinion on this question was elicited.

Trouillet [31 Feb. 28, '94] publishes a rare case of fracture. A young soldier fell into a water-closet and was paralyzed, sustaining a fracture of the right fronto-parietal bone. He retained consciousness, could speak, and replied to questions. There was paralysis of all four extremities, and the sensory disturbances were greater on the left side. Pain in the neck was severe. Finally, subconjunctival ecchymoses on both sides, paralysis of bladder and rectum, and hyperpyrexia supervened, death occurring on the fourth day. At the autopsy a depressed, splintered fracture was found in the right fronto-parietal region. On removing the calvarium a large clot was found between the bone and the membranes corresponding to the fracture-area and compressing the brain. No clot on the left side and no macroscopical lesions in the brain could be discovered. At the base, in the anterior fossa on the right side,

there was a fracture involving principally the orbital plate of the frontal bone, and an analogous condition on the left side. There was no connection between these fractures at the base, nor did either of them connect in any way with the fracture of the vault.

Spear, of Freeport, Me., $^{99}_{\text{Sept.21,'93}}$ treated a young man who was thrown against a rusty nail, which penetrated the left parietal bone and broke off flush with the surface. About one-third of the nail passed through the bone. He became unconscious; had stertorous breathing; full, slow pulse; and dilated pupils. It was impossible to remove the nail by forceps, and a trephine was employed, removing the disk of bone perforated by the nail. Consciousness returned almost immediately, and the patient made an uninterrupted recovery.

Haddon, of Canonbie, N. B., $^{6}_{\text{Nov.18,'93}}$ reports the case of a physician who fell from his horse, receiving a fracture of the skull. The patient persisted that there was no fracture until the onset of Jacksonian convulsions on the fourth day following the injury. He became semicomatose, with Cheyne-Stokes respiration. The convulsions affected the left side and began in the arm. Operation was performed by Macewen. An incision was made above the right ear, and a piece of bone the size of a shilling was removed from over the arm-centre. It was found that the skull was fractured. A fissured fracture extended from this point in the direction of the base of the skull. The cerebral substance was lacerated and congested, and a large clot lay under the dura mater. There was no cerebral impulse. He had a fit just after the operation, followed by others, but the interval between gradually became longer, until finally they ceased. He then became violently insane, and a marked tenderness developed along the mastoid and down the neck as far as the angle of the jaw. An active diuresis was established after some days, and from this time on the symptoms gradually improved.

Smith, of St. Louis, Mo., $^{82}_{\text{Apr.21,'94}}$ presented to the St. Louis Medical Society a little girl, 18 months old, who had fallen against the metal corner of a trunk. The injury, which seemed slight, was followed in a few days by chills, fever, and suppuration. The discharge escaped through the nose, and was accompanied by several hæmorrhages. In cutting down upon the bone, a fracture penetrating the membranes and an abscess about the size of a

filbert, situated in the membranes and communicating with the frontal lobe, were found. The symptoms ceased as soon as the abscess was drained.

White, of Philadelphia, $^{112}_{\text{Mar.,'94}}$ reports a case of compound depressed fracture of the skull, which was trephined, the patient recovering, but developing mania in a short time.

Putnam, of Whiting, Ind., $^{59}_{\text{July 14,'94}}$ describes the case of a man who was struck on the top of the head with an iron hook, which penetrated the superior longitudinal sinus. When he coughed, blood was thrown from the opening in his head fully four feet; he was taken to Chicago, where Senn secured both ends of the divided sinus with forceps, and fastened them in place with a plaster-of-Paris dressing enveloping the whole head. The forceps were removed at the end of four days. At the end of twelve weeks the patient left the hospital with partial paralysis of one side.

Roberts, of Philadelphia, $^{19}_{\text{May 26,'94}}$ and Eve $^{86}_{\text{Mar.,'94}}$ also report recoveries from a pickaxe wound in the brain. Morer $^{31}_{\text{June 2,'94}}$ reports a case of depressed fracture of the vault of the skull, in which no symptoms were noted for four days and a half. The patient then developed paralysis of the face and upper and lower extremities. Upon operation a small submeningeal abscess was discovered. Recovery ensued.

Mayo, of Rochester, Minn., $^{1}_{\text{Apr.7,'94}}$ saw a patient, aged 11 years, who had been thrown from a wagon and was picked up unconscious and bleeding freely from the nose; while being carried home she had a severe attack of vomiting. There was a small scalp wound on the anterior part of the left parietal bone. Consciousness did not return during the first week, and she was nourished during this time by rectal enemata. After the second week she could swallow small quantities of liquid nourishment. There was complete right hemiplegia; the eyes were fixed in an upward direction, the left pupil being the more dilated. On the fifth day after the injury there were twenty-five convulsions; these continued for a week, the number each day, however, becoming less. For six weeks she remained comatose, urination and defecation being involuntary. Seven weeks after the injury she was trephined over the left fissure of Rolando. The dura bulged into the opening and did not pulsate until considerable bone had been

removed. Upon opening the dura, 4 ounces (120 cubic centimetres) of clear, watery fluid escaped, and the whole left frontal lobe was depressed, this depression being an inch from the skull, over the Rolandic area; the fluid was between the arachnoid and the dura. A large cavity remained, which was drained with catgut and the wound closed. Four months later the child had perfectly recovered.

Rogers and Eskridge, of Denver, $\frac{9}{\text{May } 12,'94}$ report the case of a patient who walked off a train running at full speed. When found he was unconscious, and there was a severe wound in the head and an extensive compound fracture, with marked depression one inch in front of the sagittal suture and about three inches below the median line. Externally the two sides of the fracture diverged at an angle of about thirty-five degrees backward and were each about two inches long. The internal plate was depressed over a much larger area than the external; the dura was extensively torn, and on raising the depressed bone the blood flowed freely through this wound. An opening was therefore left immediately over the tear in the membranes. The patient made a good recovery from this operation, but a month later was attacked with a severe choleraic diarrhœa, prevalent at that time, and died. At the post-mortem the wound in the skull was found to be completely closed except for a small orifice. New bone seemed to have formed, making a translucent diaphragm across the opening; the membranes were healed, and the brain was normal and healthy.

Romniciano, of Bucharest, $\frac{118}{\text{Jan.},'94}$ operated on a child of 4 years, with a compound fracture of the left parietal bone. A large hernia cerebri followed, which was gradually controlled by pressure. McComas, of Sturgeon, Mo., $\frac{82}{\text{July } 14,'94}$ operated upon a boy, aged 16, who had received a compound fracture of the frontal bone above the left orbit. Operation was declined for several days, but was finally performed after the patient had had a convulsion. A piece of bone was found driven into the brain-substance, which could not be removed except by considerably enlarging the cranial opening. An irregularly-shaped piece of bone, showing a more extensive fracture of the inner than the outer table, was then extracted, and immediately about 3 ounces (93 cubic centimetres) of pus escaped. A hernia cerebri developed, which was removed by carrying a double-threaded needle through its base and then

ligating each half separately. The hernia was then excised and the wound closed, the patient recovering.

Da Costa, of Philadelphia, [9 Sept.9,'93] describes the interesting case of a man operated upon for depressed fracture of the skull, the cavity being packed with iodoform gauze. When dressing the wound, some days later, the number of pieces of gauze left in the wound was forgotten, but, as there was apparently only one, that was removed. Ten days later the patient began to have symptoms of mania, and, as there was still a small sinus, this was explored and a piece of gauze was withdrawn from the direction of the lateral sinus. The next morning all symptoms of mania had disappeared.

Eve [86 Dec.,'93] trephined a man with a wound on the left side of the frontal bone, an inch above the orbit. The fracture extended from this point backward to the occipital bone, and pieces of the cranium were removed along an area two by six inches; there was also a fracture of the orbital plate. The patient recovered. McLoughlin, of Jersey City, [9 Apr.23,'94] reports a case of recovery after operation for a compound comminuted fracture of the frontal and ethmoid bones, with injury to the meninges and laceration and protrusion of the brain-substance. Other cases of fracture of the frontal bone and the orbital plate, with recovery, are reported by Sterling, of Victoria [285 Apr.15,'94]; Dupraz, of Villars-sur-Ollon [91 Jan.10,'94]; Atkinson, of Hong Kong [2 June 23,'94]; Fitch, of Graham, N. C. [43 May,'94]; Palmer, of Ararat [285 May 20,'94]; and one case in which death resulted from suppurative meningitis of the base, with pus in the ventricles, by Desbonnets, of Lille. [220 Aug.18,'94]

Brentano, of Berlin, [69 May 17,'94] in compound comminuted fractures of the skull, removes only the fragments which have no connection with the soft parts and which are also denuded of periosteum. Wedged fragments are liberated with the mallet and chisel when they cannot be moved by the thumb-forceps. The methods of closing defects in the skull by celluloid or decalcified bone or other foreign plates are only applicable to recent trephinings, and the Wolff-Wagner method of temporary resection renders them useless. Decalcified bone undoubtedly favors bone-production. In five cases reported, five days after the operation the fragments were firmly united with the dura, but after eight months they were not entirely replaced by normal bone. Seven days after the

operation the fragments were united by vascular connective tissue so that they could not be removed without severe hæmorrhage. If brain-symptoms appear soon after a closure of the defect, it is very easy to remove the transplanted bone. Von Bergmann, of Riga, [21 Dec.30,'93] believes that in all cases of compound fracture, where the brain is exposed by the gaping wound, removal of the fragments of the skull and cleansing of the brain-tissue are very important. It is also essential to interfere whenever symptoms of increasing pressure are present, especially if the injury is near to a sinus or meningeal vessel, or when the external wound leads down upon a foreign body. Secondary trephining must be performed when symptoms appear at a later period which are attributable to the injury, as, for instance, brain-abscess, softening, cysts, or cicatrices. The least satisfactory results are obtained in those cases in which the operation is done for Jacksonian epilepsy due to the scar. Herhold [69 June 14,'94] considers immediate trephining after injury less satisfactory than secondary trephining.

Eigenbrodt, [336 Aug.11,'94] in a paper on cephalohydrocele and clefts in the skull after simple fracture in children, reports forty-six cases, and says that complete closure of the cleft seems possible only during the first two months. Puncture is of value, but a radical operation with transplantation of a periosteum-bone flap is only feasible in older patients.

Other cases of fracture are reported by Bousquet [14 May 14,'94]; Spotswood, of Fairford, Ala. [59 Apr.28,'94]; Lal [1055 Feb.16,'94]; Harbin, of Calhoun, Ga. [117 May,'94]; Lampson [51 Nov.,'93]; Johnson, of Germantown, Pa. [9 Nov.18,'93]; Saunders [74 June,'94]; Simons, of Charleston, S. C. [202 May 10,'94]; Strickland and Vest, of Hartselle, Ala. [199 July,'94]; Thomason, of Guntersville, Ala. [186 June,'94]; Hitchcock, of Detroit, Mich. [234 June,'94]; McNabb, of Knoxville [81 Dec.,'93]; Rodmann, of Louisville, Ky. [224 Jan.13,'94]; Stewart, of Gettysburg, Pa. [112 Nov.,'93]; Poredi [1055 Oct.1,'93]; Wyman, of Detroit [339 Sept.,'93]; Macartney [213 May,'94]; Binzler, of Hanover [13 May 15,'94]; Shipps, of Bordentown, N. J. [59 Feb.24,'94]; Thomalla [336 Oct.14,'93]; Bird, of Melbourne [285 Dec.15,'93]; Menocal [773 May 20,'94]; Maula Buksh, of Lucknow [239 Jan.16,'94]; Gillis, of St. Louis [364 Dec.1,'93]; Payne, of Locust Grove, Va. [81 Feb.,'94]; Pinkerton, of Salt Lake City, Utah [2044 '93]; Miyake, of Tokio [200 Dec.23,'93]; Le Moyne, of Pittsburgh, Pa. [161 May,'94]; Thomas, of Liverpool [187 July,'94]; Kemper and Cowing, of Muncie, Ind. [56 June,'94]

Fractures of the Base.—Furber [2 Apr.28,'94] reports a case of fracture

of the middle and anterior fossæ of the base of the skull, with intra-cranial effusion, causing twitching of the left leg and arm and proptosis of the left eye. There was also injury to the third nerve, causing crossed diplopia, well-marked amnesia, and loss of smell and taste. There was a severe scalp wound over the right temporal region. The patient was reported well two months after the injury. Crile, of Cleveland, [9 Jan.6,'94] also reports a fracture of the base with recovery after treatment consisting of full doses of potassium iodide.

Barclay, of St. Louis, [109 May,'94] says that the propriety of properly dressing the external wound of a compound fracture of the skull is indisputable. When this wound lies within the middle-ear, circumspection and judgment, not simple routine, should direct therapeutic procedures. It is always better to treat each individual case upon its own merits, making first a painstaking examination to ascertain exactly the condition of the parts and the patient before interfering. He reports three cases of fracture of the base with involvement of the middle-ear, two of which recovered and one died.

GUNSHOT WOUNDS.

Chauvel [14 Jan.14,'94] gives the history of a patient of Chupin's, shot in the occipital region, but who did not lose consciousness, and had no paralysis nor contracture. There was a notable depression, and trephining showed that the internal plate pressed upon and injured the dura mater; no other lesions were found. He considers trephining indicated in all these cases. Marchant, at the same time, reported the case of a young man with a revolver wound of the frontal region, the bullet being found very deeply imbedded, the dura mater perforated, a small cavity filled with blood and broken-down brain-matter being found below. Recovery ensued. Péan, of Paris, [451 May,'94] operated on a child 4½ years old, who had received a pistol-bullet of small calibre in the right eye, the globe being perforated and the brain entered. For three weeks varying cerebral symptoms appeared, and after ten weeks the patient became intelligent, but complained of slight pains in the right orbital region. There was slight facial paralysis on the left side and left-sided monoplegia of the upper extremity and slight paresis of the lower. A diagnosis of a peri- or intra- cerebral

abscess of the middle portion of the ascending frontal and parietal convolutions was made, and, at operation, about 200 grammes (6½ ounces) of pus were evacuated. One month later the movements of the arm were normal, and the injured eye could count fingers at a distance of over five yards. Delorme [14 Mar.14,'94] reiterates the views expressed by him a year ago, that operation in these cases is useless. Antisepsis of the superficial areas seems to him alone possible and advantageous. Quénu, [2 May 12,'94] on the contrary, believes that trephining should be done at once, and he reports three cases treated in this way. The first was not operated on for three weeks, and pus had collected under the dura, at the seat of the injury; a fragment of lead was removed from the brain and the suppurating cavity drained. Six weeks later the patient died in epileptiform convulsions. The second case was also treated expectantly at first, but, on the fourth day, on account of cephalalgia, the wound was enlarged and five balls found, two fixed in the bone, two lying on the dura, and the fifth imbedded in the brain. This patient recovered. The third case was operated on at once for a penetrating gunshot wound of the forehead, with a second wound at the back of the head, and, as no bullet was found, it was thought to have made its escape. The patient recovered.

Malfilatre [203 Apr.1,'94] reports the case of a man of 70 years who shot himself, with a revolver, in the right temple. The only symptoms were a slight deviation of the tongue to the left, slight word-blindness, and difficulty of deglutition. Some days later an attempt was made to find the ball, under cocaine anæsthesia, and it was discovered partially imbedded in the parietal bone. The reason it had not completely penetrated was that it had somewhat impinged on a thickened portion of the bone and had been pressed out, so that one portion of the bullet penetrated the skull while the other spread out over the external surface of the bone. Recovery followed the operation, and in the discussion of the case Buffet, Cerné, and Deshayes expressed themselves as favoring immediate operation.

Schwartz related to the French Academy of Medicine [22 Aug.1,'94] the case of a man with abundant epistaxis following the penetration of two revolver-bullets in the right temple. Believing that the blood came from a vessel in the nasal fossa, the external carotid on the left side was tied and, later, the external carotid of the

right side. As the hæmorrhage was not controlled, the nose was cut across and turned down on the chin and the sphenoidal sinus exposed. This was found filled with clots, which were carefully removed and a plug of iodoform gauze inserted in the cavity. The nose was replaced and at the end of fifteen days the plug was removed. The recovery was excellent. Schwartz thought that the internal carotid had been injured as it emerged from the cavernous sinus. The case proves that it is possible to explore the sphenoidal sinus by cutting across the nose and to control a vascular wound by plugging.

Polaillon [14 Apr.1,'94] reports a successful case operated upon by Poirier, and two cases operated upon by himself. In one case the ball, which was not found, had penetrated the right temple, and the patient died. At the autopsy it was discovered that the operator had made a false passage and that the ball was lying behind the track of the probe. The second case was wounded in the frontal region, and a probe passed completely through the brain to the occipital region without discovering the ball. This patient also died, and a false route was discovered in this case also.

Burns, of Long Island City, [1 June 30,'94] operated on a young man aged 19, with a self-inflicted bullet wound of the left temporal region. About two inches from the surface of the brain a large section of a circle of bone, which had been driven in by the bullet, was found. Posterior to this channel the dura was incised, on account of some blood-clots, and four smaller fragments of bone, completing the circle, were found. The bullet was not traced, but recovery was complete.

Monod [14 Apr.8,'94] observed a case in which, after penetrating the skull, the bullet was reflected by striking a bony projection, and at the autopsy was found lying in an entirely different position from that which it would be expected to occupy from its wound of penetration. This case is used as an argument against intervention.

Tefft, of Springfield, Mo., [59 Apr.21,'94] reports a case almost identical with that of Fluhrer's some years ago, excepting that this patient died and through drainage was not employed. The wound of penetration was in the frontal bone, seven-eighths inch above the upper margin of the left orbit and one inch from the middle line.

A probe passed directly through to the occipital bone, which was trephined, broken-down brain-tissue being discovered. The bullet was found deflected downward about one and one-half inches and imbedded in the brain one-half or three-fourths inch. The patient was conscious for three days; the special senses were unaffected; articulation was fairly good, though some defects were noticed; the right leg was weaker than the left, but there was motion in it; and the right arm was much weakened, with a tendency for the forearm to be slightly flexed. On the eighth day restlessness, alternating with somnolence, set in, the temperature rose, the pulse became frequent, the pupils dilated, and gradually the patient became comatose and died twelve days after the operation. No pus was found along the track of the ball, and no thorough autopsy was allowed.

A careful study of the difference between certain wounds inflicted by the projectiles of large- and small- calibre hand-weapons has been made by La Garde. 451 Mar.,'94 The following authors have also reported cases of gunshot injury: Morton, of Philadelphia 119 Apr.21,'94; Tuffier 14 Mar.18,'94; Rougé 100 Mar.20,'94; Irvine 36 Apr.,'94; Fuchs, of St. Louis 364 Dec.1,'93; Cerné 203 Feb.1,'94; Lusk 227 Apr.,'94; and Everman. 21 May 19,'94

EPILEPSY.

Chiene, of Edinburgh, 36 June,'94 states that he has only seen marked good arise from operation in cases of a distinctly traumatic origin, and particularly in those in which the injury involved the motor areas in the neighborhood of the fissure of Rolando. He believes that one of the main improvements in technique in the future will be a more extensive removal of the calvarium.

Bramwell 36 June,'94 divides epilepsy into the following groups: 1. Traumatic cases, in which there is a distinct scar or depression on the surface of the skull, and in which the epileptic discharge begins in the portion of the brain-tissue (gray matter) situated immediately under the seat of the external injury. In these trephining is clearly indicated and in these the best results will be obtained. The operation is most clearly indicated when the scar or depression is situated over the motor area in which the spasm commences. In those cases in which there is a scar or depression on the surface of the skull, and in which a general epileptic fit

is preceded by an aura not consisting of a localized spasm, but which is sensory in character, the operation is less likely to be successful. 2. Traumatic epilepsy in which a depression or scar is situated on the surface of the skull, and in which localized spasms or an aura of some kind show that the epileptic discharge begins in a definite area of the brain-cortex; the portion of gray matter which is first discharged does not correspond to (immediately underlie) the position of the external injury. Here operation is less likely to be successful, but when medicine has failed operation should be tried. In this class of cases the surgeon should first trephine over the position of the scar or depression, and then, if no source of cortical irritation is found in that situation, over the area of gray matter which is first discharged. 3. Traumatic epilepsy in which a scar or depression represents the position of a former injury to the skull, but in which the epileptic fits begin with a general discharge, without any localized spasm or definite aura. The opening should be made at the seat of the injury. The operation is experimental and is rarely likely to be attended with success. When no irritation is found beneath the external cicatrix it is useless to proceed farther. 4. Cases of idiopathic epilepsy, in which fits always commence with a localized spasm or with a definite aura, constant in character and definitely indicating the position of the area or centre of gray matter which is first discharged. In these cases trephining should also be performed, provided that drug treatment has failed. The mode of commencement of the spasm or the character of the aura is the guide to the position of the gray matter which is first discharged. 5. Cases of idiopathic epilepsy, in which there is nothing to show that the epileptic discharge commences in a localized area of the brain,—that is, where there is no localized spasm at the commencement, no definite aura, or in which the aura is of a general non-localizing character, such as an indescribable feeling in the stomach or elsewhere. The results of operative interference are here very unsatisfactory and should only be performed when medicinal treatment has been thoroughly tried and failed, and when the conditions are desperate,—as, for example, when the frequent recurrence of the fits prevents the patient from performing the ordinary duties of life and is producing great mental deterioration or actual insanity. Here the operation is purely an

experimental one, and apparently an experiment of a very doubtful kind. Annandale, of Edinburgh, $^{36}_{\text{Apr.,'94}}$ holds practically the same views as Bramwell.

In spite of the general opinion of the uselessness of operating in idiopathic epilepsy, a few cases have been reported within the past year. Crowley, of Oakland, Cal., $^{147}_{\text{Mar.,'94}}$ operated on a patient, 26 years of age, who had had epilepsy since childhood. Her memory had become impaired and speech had been defective for three years prior to coming under observation. The operation was performed over the parietal eminence on the left side, hoping to give relief to the speech-centre as well as to the epilepsy. The skull was unusually thick and the dura mater was adherent. For several days after the operation speech was very much more affected, and examination of the wound disclosed pus and unhealthy granulations. As soon as this was opened and evacuated, improvement was marked. Three months after the operation she had remained free from all epileptic attacks.

Alexander $^{2}_{\text{Nov.25,'93}}$ publishes ten cases, five of which were idiopathic, all being improved. Although the results have not been very brilliant so far as the curing of the disease is concerned, still they are certainly encouraging and will probably improve with time. The operation is perfectly safe, justifiable for exploratory purposes, and should always be complete, so as to thoroughly explore the area likely to be affected. Kennedy, of Chambersburg, Pa., $^{814}_{\text{Mar.15,'94}}$ reports very briefly five cases operated upon, three of which give no history of injury, and in all of which, according to his statement, there was no return of the epilepsy, although several years have elapsed. This is the more remarkable since the results are apparently so different from those obtained by the majority of operators.

Hadra, of Galveston, Tex., $^{1}_{\text{Dec.9,'93}}$ thinks that modern researches promise to divest even so-called genuine epilepsy of its mysterious functional character, and make it, consequently, more accessible to surgical interference. It is necessary to have a better knowledge of the great number of brain-centres that must exist. It is an unquestionable fact that very often the stomach or the intestines give the initial symptoms, but, as we do not know these centres, and as the signals are very abstruse, it may easily happen that another group of muscles, which had only secondarily become

excited, is charged with giving the signal. We must next find the real seat of the primary morbid changes in the brain, though not necessarily the focus belonging to the initial signal. Topographical and electrical localization map out only the latter. The induced current used in a different way would be all that we could desire for such a purpose. It must be applied over a large area of the exposed cortex until a spot is found from which not only a certain group of muscles can be made to contract, but a regular epileptic fit can be elicited. This spot must be the locality of the morbid substratum, whether it coincides with the physiological focus of the muscles giving the signal or not; consequently this spot must be removed.

Apert $^{14}_{\text{Mar.18,'94}}$; $^{814}_{\text{May 15}}$ operated on a woman, 29 years old, who for sixteen months presented symptoms due either to hysteria or to general paralysis. At the time of the operation there was semi-coma, complete right hemiplegia, convulsions of the right face and arm, and aphasia. Trephining was done over the face-area on the left side and nothing abnormal was found, but the relief from the symptoms was immediate, there remaining only an abnormal quickness of ideas, paresis of the right hand, exaggerated muscular excitability on the right side, and partial aphasia. One month after the operation an inequality of the pupils developed, the right being larger than the left.

Bogdanik $^{586}_{\text{No.32,'93}}$; $^{2}_{\text{Jan.13,'94}}$ relates the case of a boy of 16 years, with idiopathic epilepsy of two years' standing. Medicinal treatment having failed, neurectomy of the sympathetic was performed. The left middle ganglion was exposed close to the inferior thyroid artery and excised with scissors. The operation was followed by decided amelioration. By the end of three weeks the fits, which had previously been very severe and had recurred daily, ceased altogether.

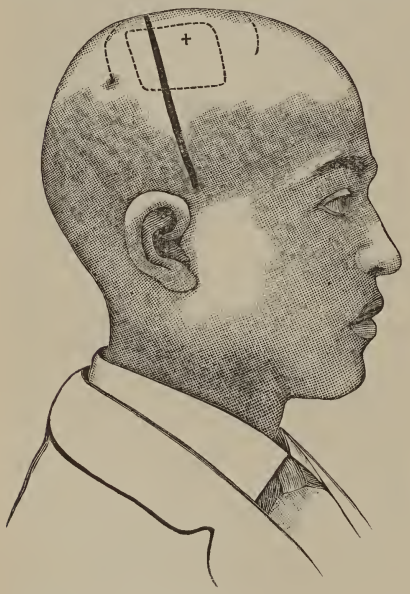
Lucas-Championnière, $^{212}_{\text{May 25,'94}}$ unlike most surgeons, does not consider true epilepsy as hopeless from an operative point of view. After trephining he considers that certain encouraging facts have been noted, and he says that he has seen cases in which attacks have disappeared for several months, and when they have returned they have been much less severe than formerly. He instances a case in which for ten years nocturnal attacks were so severe that the patient had to be kept under surveillance, but after

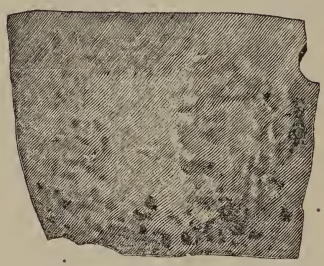
operation they became gradually less violent and the patient no longer required such close observation. In case the first operation did not produce definite results, he would be disposed to operate several times in the hope of some benefit each time. He always trephines in Jacksonian epilepsy, but he does not admit that this type is an absolute indication for operation and that the latter always gives positive results. Caird [36 June,'94] believes that the most encouraging results are obtained in traumatic cases, and that before trephining, where there is no evidence of a coarse lesion, the question of nerve-stretching should be discussed. Cotterill, in the discussion, characterized this dictum as too strong, and expressed the belief that if in so-called idiopathic cases there is a distinct localizing symptom, it is right to trephine when all other forms of treatment have been tried and failed.

Cunningham [2 Aug.11,'94] reports a case of Jacksonian epilepsy following an injury to the left side of the head, with an operation for the elevation of depressed bone. The fits usually began with numbness and tingling in the right hand, sometimes with cramp in the epigastric region. Complete and definite information was obtained regarding the time and sequence of the various motor and sensory phenomena. Meningeal thickening, with adhesion of the membranes to each other and to the cortex, the chief seat being about the genu of the Rolandic fissure, was diagnosed. This portion was exposed and the patient made a good recovery from the operation, and had one slight fit on the following day, which was not repeated.

Kellogg, of Battle Creek, Mich., [855 May,'94] reports a case of Jacksonian epilepsy in a boy of 9 years, the aura consisting in a peculiar numb sensation in the left hand, which could be prevented by placing the hand in cold water or by firmly seizing some object in his hand. The attacks usually came on immediately upon rising in the morning, and, if he escaped the first hour after rising without an attack, no further difficulty was experienced during the day. The cranium was opened over the motor area for the hand, the skull being found remarkably thin and an extraordinary degree of intra-cranial tension being present. The dura was incised and the brain carefully explored, but no evidence of disease was discovered. Four weeks after the operation there had been no recurrence of the fits, but there was

still a slight numbness in the left thumb, which had persisted since the first operation and had first involved the whole hand. Prior to the operation the mental apathy was so great that it was sometimes difficult to attract the boy's attention; but in the short time which has elapsed since, there has been a complete change in his manner and behavior. He is intelligent and active, and his movements are quick and sprightly. The accompanying cuts illustrate the operation. Bell and Adami $\frac{282}{\text{Mar.,'94}}$ presented to the





Section of bone removed. (Natural size.)

Side view of section of bone removed. (Natural size.)

TREPHINING FOR EPILEPSY, AND LOCATION OF FISSURE OF ROLANDO AS DETERMINED BY CHIENE'S METHOD. (KELLOGG.)

Modern Medicine and Bacteriological World.

Montreal Medico-Chirurgical Society the specimens obtained from a patient suffering from epilepsy, due to an abscess and cyst of the brain, trephining and exploratory puncture being performed.

Chapman, of Bessemer, Ala., $\frac{9}{\text{Feb.24,'94}}$ operated on a boy who, some years before, had received a fracture of the parietal bone. Three weeks after the injury he began to have epileptic convulsions, which had become frequent and severe. Considerable pressure from the depressed bone was found, and the membranes were hard and indurated. These indurations were cut out and the edges of the dura brought together by continuous suture. For two months the patient continued to have convulsive seizures, but

they gradually grew less, until they ceased; and at the time of the report, four and a half years after the operation, he was free from all signs of epilepsy. Carline [2 Feb. 24, '94] operated on a youth of 17 years, who, five years before, had received an injury to the head from the fall of an iron girder, and had developed epilepsy, having four or five fits a day. Medicinal treatment proved useless, and, the symptoms pointing to irritation over the right motor area, trephining was done at this point. A dense, smooth growth of bone was found on the internal surface, and the periosteum dipped into and was very adherent to a fissure in the bone. This was evidently the remains of an old fracture. The depressed bone was removed and the patient made an uninterrupted recovery.

Barber, of Brooklyn, N. Y., [157 Oct., '93] says that he is not sufficiently encouraged to urge the operation except in most desperate cases, where medication is without any results. He reports the cases of three patients, the first operated upon by the elder Hammond, about eight years ago, with no immediate improvement but gradual abating of the attacks until he had but one in three weeks; these had continued, however, up to the present time, with an interval that was never longer than three weeks. The second was operated upon by Deaver five years ago. Subsequent to the operation he was free from attacks for a period of seven months. He then had one seizure at night. Thirteen months passed without a fit occurring during the day-time, but from the recurrence of the day-fit he has had from eight to ten every twenty-four hours. The third case was operated upon by Rockwell, seven years ago, with a relief from the fits for one week, when they became as frequent and severe as ever. The author also reports one case operated upon by Wells nine years ago; for about one month the patient had no return of the fits and remained free from seizure for one year. He says, in conclusion, that he considers that the results obtained where no tumor or thickening of the cerebral covers, cicatrices, or cysts are found, or depressed bone removed, are due simply to the lessening of the pressure upon the brain. As the attacks have returned in all the cases which have come under his observation, he believes the cause of failure to be due to the fact that the brain rapidly loses the effect of the lessened pressure and is soon again in the same condition as before the operation. Where results are contrary to all reasoning, failures

may be due to the manipulation during the operation causing a disturbance or irritation of the cerebral matter. Where the cause of the epilepsy is an injury, trephining should be done as soon as epilepsy is diagnosed. When an epileptic gives a history of a neurotic inheritance, Barber does not consider trephining of any avail, even though the exciting cause be a traumatism.

Mynter, of Buffalo, $^{96}_{\text{May,'94}}$ operated on a man of 24 years, who had received an injury in the left frontal region twelve years before, several pieces of bone being removed. Six years after the accident he began to have epilepsy, and finally reached a condition in which he was continuously in the status epilepticus. At the time of the operation he had been in this condition for thirty hours. He was trephined over the point of injury, the bone being found hypertrophied, strongly adhering to the dura and pressing it inward. The next day he had six attacks, but improved rapidly, and soon returned to his work. He had no attacks for seventeen months, when they again returned and began to grow more frequent. A second operation was performed, the bone removed from the other side of the incision being in the same condition as that operated on before. His recovery has been as satisfactory as after the first operation, and for two years he has been free from recurrence. Thevard, of Blois, $^{100}_{\text{June 14,'94}}$ operated on a child who, eight years after an injury to the skull, developed epilepsy. All of the depressed bone was removed and there was no injury to the dura. Fourteen days after the operation there was a slight attack, the patient remaining free from all attacks for eighteen months afterward. Huselton $^{161}_{\text{Apr.,'94}}$ reports the case of a man who had received a depressed fracture of the skull twelve years before. He developed epilepsy and finally became insane. The depressed portion of the skull was removed and the bone found remarkably thickened, not only at the seat of the fracture, but for a considerable distance around it. This was all removed, but it was some time before his mental condition showed signs of improvement. He had no more convulsions, but was delirious and noisy. About two weeks after the operation, however, he began to show signs of improvement, and his recovery was then continuous and rapid.

Manteuffel, of Dorpat, $^{21}_{\text{Feb.10,'94}}$ says that, in operating for epilepsy, it is advisable to remove a larger piece of the skull than is necessary for the removal of the affected centre in the cortex,

so as to prevent the two cicatrices from lying upon each other. Brenner, of Linz, $^{336}_{\text{July 7,'94}}$ describes the case of a boy of 15 years, who, five years before, had received an injury of the right parietal region, which was followed by prolonged suppuration. Six months later he had his first epileptic attack. Wagner's method of trephining was performed, the skull being thickened and a small portion of discolored cortex was found; this was removed together with the thickened bone, and the bone-flap replaced. The motor centre of the upper extremity was involved in this case. The patient recovered. Leyden, of Berlin, $^{69}_{\text{July 26,'94}}$ presents a case of epilepsy with hemiplegia cured by trephining. Four weeks after the operation sensation returned and the hemiplegia was improved. Prengrueber $^{996}_{\text{May 19,'94}}$ reports a case of partial epilepsy with paralysis and aphasia cured by simple trephining.

McCosh, of New York, $^{96}_{\text{May,'94}}$ cites a case of epilepsy in a girl of 7 years of age, with partial paralysis of the right upper and lower extremities. Trephining was done over the left motor area, a considerable portion of the bone and a reddish membrane situated between the dura and the brain, as thick as a sheet of note-paper and about two inches in diameter, being removed. There was a rapid recovery from the operation, but only slight improvement in convulsions and paralysis. A few months later the convulsions increased in frequency, and the case was again admitted to the hospital with typhoid fever. After the first week of the fever there had not been a convulsion or a spasm of any kind, and this continued for two months after the cessation of the fever, the time of the report. Wyeth, in the discussion, said that he had seen an analogous condition in two patients. In one marked improvement for two months followed trephining, when the attacks recurred, but were less severe and less frequent. Abbe remarked that the insertion of gold-foil to prevent the formation of adhesions might prove beneficial. Gerster had tried this plan successfully in one case. Darbey, of Americus, Ga., $^{81}_{\text{May,'94}}$ reports three cases, all of which were relieved of epilepsy by operation. Greenlees, of Grahamstown, South Africa, $^{166}_{\text{July,'94}}$ reports the case of a woman of 39, who had epileptic mania. It having been determined that a lesion would probably be found by operation in the region of the middle and upper portion of the ascending frontal convolution on the right side, trephining was performed at this point. The dura

was found to be very thick, but the cortex seemed perfectly normal. For over a week she had no fits; they then returned, but were diminished in number and severity. She rapidly recovered her mental state.

Cleghorn $\frac{557}{\text{Oct.,'93}}$ gives the histories of four cases of Jacksonian epilepsy and one in which no focal lesions could be demonstrated. This last case was not benefited by the operation, and two of the others have relapsed and are in the same condition as before, while two are improved, one seven months and one a year after the operation.

TREPHINING IN MENTAL DISEASES.

Régis, of Bordeaux, $\frac{14}{\text{Apr.1,'94}}$ reviews the literature of this subject, and concludes that to cure general paralysis it is better to direct the attention to a possible syphilitic infection, better results being possible in this direction than from trephining and cerebro-spinal drainage.

Hawkes, of New York, $\frac{59}{\text{Aug.25,'94}}$ trephined the frontal bone, in a patient aged 28 years, for headache which had persisted for twenty years and had followed a traumatism. There was a very slight indentation over the frontal region not over one-half an inch in length. The disc of bone was found slightly thickened, but there was no sign of fracture. From the time of etherization to the time of the report, apparently about three years, there was no return of the cephalalgia. The author finds only two similar cases in literature, but the editors recall a third case reported some years ago by the late James L. Little. Patterson, of Reno, Nev., $\frac{147}{\text{June,'94}}$ operated on a man, 28 years of age, suffering from acute mania following a traumatism. He had been kicked by a horse just in front of the right parietal eminence about a year before. There was a slight depression at the seat of the injury; the bone was thickened and the dura presented an unhealthy, gray appearance. For the first twenty-four hours following the operation he was perfectly sane, then relapsed for a few days, but a month later had apparently completely recovered.

Samain $\frac{220}{\text{Aug.25,'94}}$ records a case of mental disturbance following a traumatism in the frontal region. The patient was in a state approaching idiocy and dementia. Duret operated by tapping the lateral ventricles, the mental condition being thereby much im-

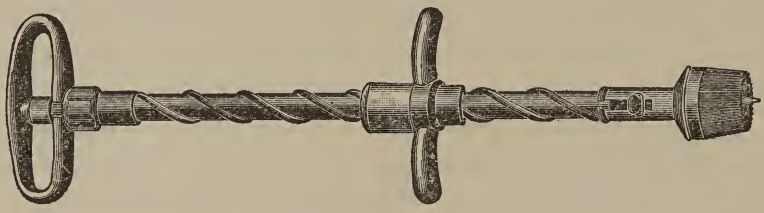
proved. Annandale [36 Apr.,'94] believes that the cases of insanity following cerebral traumatism come under the head of justifiable exploratory operations, provided the exact site of the injury can be determined. The opening should be free and the pathological conditions carefully investigated. He regards general paralysis as amenable to the same treatment, but not general insanity. Springthorpe [285 Oct.15,'93] reports three cases of trephining for traumatic insanity and insanity with well-marked hallucinations. In the first there was bony thickening following an injury (the region is not stated, but somewhere over the frontal cortex). Considerable improvement followed the first operation, and a second was undertaken, which was, in his opinion, deleterious. In the second case there was chronic mania with left auditory hallucinations and weakness of the left arm. Trephining was done midway between the right auditory centre and the end of the second frontal convolution. There was marked improvement, but not absolute relief, and four or five months later a return of the symptoms was noted. The third case was one of delusional mania following injury over the left eyebrow. There was no fracture of the skull at the time of the injury. Trephining was done over the left frontal lobe and no pathological lesion was found, the condition of the patient remaining much the same as before.

Smith, of London, [6 July 28,'94] reports the case of a boy, 5½ years of age, with spastic paralysis which had persisted from birth. There was a transverse depression in the occipital bone, two and one-fourth inches wide and about one inch long. This region was trephined and the meninges projected forcibly through the opening. There was no pulsation at first, but this soon became normal and marked improvement was at once noted. The limbs have gradually relaxed; the patient sleeps more quietly and is generally much better.

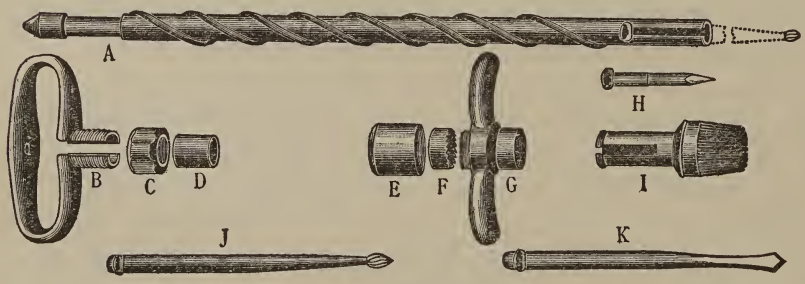
MISCELLANEOUS.

Pilcher, of Brooklyn, [96 Aug.,'94] records a case of venous tumor of the diploë, in a girl of 15 years of age, who ten years before had received a violent blow upon the head. Within a few days of the injury a small soft swelling was noticed. At the time of her admission to the hospital there was a well-defined tumor over the site of the anterior fontanelle. The contents of the tumor consisted in small part of blood-clot, and in large part of fluid blood.

Anteriorly and to the left the entire thickness of cranial bone was wanting, and over an oval space of about two and one-half by one and one-half centimetres the dura mater was exposed; to the right of this the internal plate was intact for some distance, and at the periphery of this defect the expanded, spongy, diploic layer could be seen, certain of its venous channels being open and bleeding when pressure was removed. The overhanging bone-ledge was gnawed away, the entire base of the cavity well curetted, the thin skin-covering cut away, the whole raw surface firmly tamponed with iodoform gauze, and the wound drawn together as much as possible. A slight plastic operation was eventually necessary to cover the remaining granulating surface.



The improved trephine ready for use.



Separate parts of the improved trephine.

IMPROVED ASEPTIC TREPHINE. (LEONARD.)

Annals of Surgery.

NEW INSTRUMENTS.

Leonard [96 May,'94] describes a trephine consisting of a fixed handle in which a shaft revolves, and to which the force is applied through a double-raised spiral by means of a sliding handle. The trephine is attached to this by a simple device and rotates with it. Each upward movement of the sliding handle causes the shaft and the attached trephine to make three complete revolutions; while the upward motion, by lessening, rather than increasing, the pressure

and consequent friction of the cutting edge, prevents jamming and makes cutting easy and sure.

Cryer [19 May 26,'94] demonstrated, at the Surgical Section of the College of Physicians of Philadelphia, an improved surgical engine, with its various drills, burrs, trephines, and guards, used in cutting bone for surgical operations. The principle involved in the instrument is simply that of a saw cutting in a line with the axis of the shaft of the burr, and not at right angles to it, as in the circular saw. Such an arrangement allows of cutting in any direction and upon curved lines.

Zuccaro, of Bari, Italy, [1095 Apr.,'94; 6 Apr.14,'94] exhibited to the Eleventh International Medical Congress a new instrument for trephining the skull. With this instrument circular or elliptical openings can be made, leaving a bridge or pedunculus of soft parts for nutrition, and allowing these parts to remain adherent to the bones (osteoplastic method). The instrument consists of a handle with a vertical steel axis ending in a point almost conical in shape, and having a transverse bar fixed at a distance of two centimetres from the point of the instrument by means of a screw. This small bar is inclined at an angle of sixteen degrees, and varies in thickness from one-third to one-half millimetre. It is two millimetres in width, and the cutting extremity is shaped like a nail with serrated teeth. A small knife having a double-cutting blade is also inserted in the instrument for the purpose of cutting the soft parts. This instrument saws and plows the bone in a very rapid manner. It makes a regular, narrow cut, without any hammering or shaking of the skull, and enables the operator to make large openings at any part of the head.

Wright, of Philadelphia, [451 May,'94] has devised a trephine which is applicable to the different engines in use in dental work. The elbow hand-piece, attached to a flexible shaft, has two beveled cogs arranged inside, making the motion at a right angle, or, if desired, on the straight principle. Different drills, saws, and trephines can be firmly fastened in the hand-piece. By means of an outside guard the dura may be protected from injury.

Lanphear, of St. Louis, Mo., [59 Sept.8,'94] gives a description of a new aseptic trephine which consists of but three pieces. The sharp blade is attached to a large, strong metal handle, through which passes the centre-pin, held in place by a little key which transfixes

shaft and pin. Upon withdrawing the key the centre-pin can be removed without taking the saw from its groove. The hole for the centre-pin is large, and can be readily cleaned with a piece of gauze, and the whole instrument can be boiled without danger of rusting.

Pyle, of Canton, Ohio, $\frac{59}{\text{Feb.10,'94}}$ advocates the use of diamond drills in opening the skull. After the incision through the soft parts has been completed, the largest of the set of drills is used with a mallet to groove out the furrow in the bone. The universal handle is then attached and the bone gradually cut through with simple hand-pressure, until it is necessary, in consequence of binding, to use a smaller size. The handle is then attached to one of the smaller drills until finally the skull is cut through. He claims that there is less danger of cutting the membranes in this operation than in trephining. Where the bone has been completely cut through, the section must be turned out. One of the instruments is placed in the middle of the piece of bone to be elevated, and two on each side of the point where the bone is to be broken through. An assistant is needed to manipulate the instrument occupying the middle and upper part of the piece to be raised, while the operator takes charge of the other two, and by simultaneously raising and lowering the handles of the three instruments the bone is broken. This must be done deliberately and gently, so as to allow the dura mater time to peel off without injury or causing undue hæmorrhage. Another of the instruments is used to cut away any spiculæ that may be left after raising the bone, which may necessitate the use of the mallet.

Lane $\frac{2}{\text{Nov.11,'93}}$ uses the parting tool, or angular gouge employed by carpenters, in place of the trephine, in opening the skull.

Morgan, of Indianapolis, $\frac{2090}{\text{'94}}$ has devised what he calls a trajector for determining the course of a bullet in gunshot wounds of the skull. It is composed of a solid bow of steel (A) in the end of which is a movable rod ($B\,F$). The opposite end of the bow is supplied with a triangular groove on the under surface, so that it will adjust itself to the searching probe. The probe is allowed to gravitate along the track of the bullet until it is arrested; the groove of the trajector is then applied to the probe, and the movable rod on the other end is moved in until it comes in contact with the skull. This will represent the point where the

bullet impinged upon the skull opposite the point of entrance, in case it has passed through the brain, and therefore the point for counter-trephining. (See illustration.)

Mieville, of St. Imier, $\frac{214}{\text{Mar.15,'94}}$ describes a case in which an application of Girdner's telephonic probe was made; a silver spoon placed in the patient's mouth being attached to one electrode, while the other was attached to a silver probe and used in the wound. The bullet was promptly detected.

TRAJECTOR. (MORGAN.)
Indiana Medical Journal.

SURGERY OF THE SPINE.

Fractures.—Thorburn, of London, $\frac{22}{\text{Aug.22,'94}}$ states that his experience in the post-mortem room and operating theatre has led him to believe that cases of recoil in the cervical region are commoner than those of persistent displacement, the proportion being about two to one. In the lumbar region his pathological material indicated that persistent displacement is more common; but this is fallacious, as only most severe lesions lead to an autopsy. In the dorsal region his cases were too few to allow of any statistical deductions, but it is evident that both varieties of injury may be present in every part of the vertebral column. Life may at times

be indefinitely prolonged, even in cases which are apparently hopeless, by expectant treatment. In the commoner cases in which natural recoil has followed the injury, it will not be necessary to attempt the reduction of the displacement; so, too, in fractures of the laminæ, compound fractures by direct violence, and in the secondary lesions, reduction in the ordinary sense of the term is not called for. In unilateral dislocations the conditions are the most favorable for reduction, the undisturbed articulation acting as a fulcrum from which to work. There is also a greater probability that displacement will not recur; and, most important of all, the cord-lesion is rarely so severe as in antero-posterior displacement of the entire spine. He has tabulated forty-one cases of this kind where reduction was attempted, in thirty-five of which the result was apparently successful; but in the majority there were no symptoms of any injury to the cord at all, and in none was there evidence of a complete crush.

It is almost impossible to be certain that this partial dislocation has been completely overcome, and in these cases it may recur, producing serious interruption to conduction. He has had but 5 personal cases of bilateral dislocation,—2 in the cervical region, attempts at reduction under an anæsthetic failing in both; 3 in the lower dorsal region and apparently rectified, the displacement returning, however, in all in spite of fixation by plaster jackets. He considers that in these cases reduction is not, as a rule, very difficult, but that displacement is almost certain to return. Perfect reduction of a pure dislocation would not be likely to slip; but such a result is difficult, if not impossible, to obtain. In the commoner fractures, reposition is comparatively easy; but these are precisely the displacements which are liable to recur. Unfortunately, we cannot hope for any recovery in a cord which is crushed by this kind of a displacement, and there is no satisfactory evidence that the reduction has ever cured or materially relieved the medullary symptoms; hence we do not gain much positive benefit even by a successful reduction except in injuries situated so low down that the cauda equina rather than the cord is the seat of constriction. In the cervical region these manipulations are dangerous, in injuries of the atlas and axis positively unjustifiable, while in the upper and middle dorsal region the attachment of the ribs not only renders reducible dis-

placement rare, but interferes with the operation. The useful sphere of manipulation is therefore limited to unilateral cervical dislocations and to bilateral displacements in the lower dorsal or lumbar regions, and it cannot be considered as radical treatment of the cord-lesion, but only as a means which may allow recovery to ensue. Laminectomy is likely to be of service in injuries of the spine and spinal cord only under certain special conditions. Cases in which crush is followed by recoil clearly do not call for laminectomy. These cases generally die, or, at least, do not recover the functions of the cord. Hence, in cases of persistent displacement in which the medullary injury is at least equally severe, we cannot expect recovery even if we attain by surgery a result (the removal of pressure) which, in cases of recoil, is provided by nature. Such evidence as we possess indicates that the human cord is incapable of repair after crush. The author has not been able to find, either in the published records of some two hundred cases or in a personal experience of seven, any clear evidence of benefit from operation. There are, however, certain conditions in which laminectomy is a valuable operation, and these he summarises as follows: 1. In compound fractures the ordinary wound-toilet, removal of foreign bodies and fragments of bone, is clearly indicated. 2. In injuries of the laminæ and spinous processes, with lesion of the cord, there is probably no complete crush; but here we have bony fragments driven against the theca, liable to plow it up on every movement, and not liable to natural recoil. Here operation is indicated. 3. When the symptoms are due mainly or entirely to thecal or perithecal hæmorrhage pressing upon the cord, they may be relieved by laminectomy, though such cases are extremely rare. 4. Pachymeningitis or perimeningitis may follow an injury even after a very long period, and here operation is of value. 5. Numerous cases, as well as *a priori* consideration of the conditions, indicate that if the cauda equina be pressed upon recovery will probably follow the relief of pressure by laminectomy. A plaster jacket, as an adjunct of laminectomy, is of the greatest value after the first few weeks in a case which is doing well. Its use at an early stage, however, is questionable.

Burrell, of Boston, $^{22}_{\text{Aug.29,'94}}$ read a paper at the British Medical Association, August, 1894, on a series of 168 cases of fracture of

the spine with 8 laminectomies. In the first series of cases the percentage of recovery by the expectant treatment was 22 per cent. In the second series (86 cases) it was 33 per cent. Out of the 18 recoveries in the first series, some were able to walk; 9 were bedridden. In the second series, out of 28 recoveries, 19 were able to walk; 9 were bedridden. During the year 1887, rectification of the deformity was applied four times; during 1888, twice; during 1889, three times; during 1890–91, twice, and only once in 1893. It was therefore plain that confidence in the immediate rectification of dislocations was being lost. Still, 18 of the 86 cases were treated by immediate suspension for the correction of the deformity and fixation by plaster-of-Paris jackets; 8 of these, or 44 per cent., recovered. Five operations had been performed in the second series of cases,—four of them at the end of several weeks or months, and one immediately following the injury. In the latter, death occurred almost immediately. The other 4 cases were not benefited. He believes that the do-nothing principle should be abandoned in these cases, and that whatever assistance is rendered should be given immediately after the receipt of the injury. The post-mortem examination showed that where the bodies of the vertebræ are displaced upon themselves, the cord not being torn, a pressure lasting twenty-four to forty-eight hours was sufficient to produce irremediable softening. He has done laminectomy four times for fracture of the spine. One was successful, one died; the other two recovered, but in a helpless condition. In none of these was operation performed earlier than four days after the injury, and he believes that it should be done within the first twenty-four hours. His conclusions are that all fractures of the spine, including those of the cervical region, where there is paraplegia or deformity, should be operated upon unless contra-indications exist in the way of shock. This operation should be performed at once; but if the indications are that the cord has been lacerated, surgical interference will be of no avail; if, however, it is only compressed, the results will be brilliant.

Bennett, of London, $\frac{1077}{\text{Apr.11,'94}}$ says it is of the greatest importance never to treat a case of injury to the back lightly, no matter how trivial the cause may be; if there is the least indication of interruption of bladder-power, or if there is ever so little tingling of

the hands, feet, or trunk, such a case may prove most disastrous, and should be treated at once as being serious. Cheever, of Boston, [99] believes that injuries of the cord which are supposed to be concussions, but from which the patient does not promptly recover, are due to a positive lesion,—rupture of the vessel, producing a clot. These cases may finally recover. So far as laminectomy is concerned, while this may be justifiable sometimes, the latest statistics that he has seen seem to show that the percentage of recoveries was better in cases that were not interfered with than in cases that were. Once in a while a brilliant case may result from attempts to reduce the dislocation, and the operation may be tried; but a method of treatment which can do no harm and often does a good deal of good is, after having drawn the parts down as far as possible, to immobilize the spine in a plaster jacket and keep the patient in bed.

Lejars, of Paris, [100] divides all fractures of the spine into three classes: first, those with grave medullary symptoms and marked spinal deformity; second, those with grave medullary symptoms without spinal deformity; and, third, those where there are neither medullary symptoms nor deformity. In the first group he believes, in spite of the statistics,—14 deaths and 1 case without improvement out of 15 operations,—that if the diagnosis can be made, immediate operation should be performed. The late operation only serves to reveal a grave, incurable medullary lesion, and is consequently useless. In the second series of cases cure is less exceptional, and he quotes a fortunate personal experience. He divides this series into two classes: (1) those of hæmorrhage and (2) of concussion. In the former, recovery may occur spontaneously; but here he also quotes Chipault's statistics of hæmatorrhachis. The second class he divides again into grave and incurable concussion. In the third class of cases expectant treatment is employed. In conclusion, he considers that injuries of the spine are too complex for purely mechanical consideration. The injury to the cord, its intensity and its mode of evolution, must be considered; nevertheless, an early and sufficient surgical interference is legitimate and necessary.

Myles [22] operated on a man with fracture of the third and fourth cervical vertebræ, the arches from the third to the sixth, inclusive, being removed. The neck and the appearance of the

cord were normal, but the patient died of dyspnœa on the third day of the accident. Myles considers that only in fractures by direct violence is there any reasonable hope of benefit by operation. Newton and Power, of New York, [5 Apr.,'94] operated on a man who had received a fractured dislocation of the second lumbar vertebra. Several attempts were made to reduce this dislocation at the time of the operation, by means of a strong hook, but without success. The arches of the first and second lumbar and the right transverse process of the latter were cut away. The dura was found to be lacerated and destroyed in part. No improvement followed the operation, and he died twenty-one and a half days after the injury.

Platt [99 Apr.26,'94] operated on a child who had slipped on the stairs, developing a curvature of the spine at the point of the pain, and complete paraplegia with loss of sensation. Operation was performed at the point of deformity and the laminæ of the fifth, sixth, and seventh dorsal vertebræ were removed. Several fragments were found in the wound. There was no improvement in motion, but some degree of improvement in anæsthesia. The bed-sores healed, but the child died one hundred and sixteen days after the operation. No autopsy was obtained.

Manley, of New York, [6 Apr.,'94] read a paper, before the Eleventh International Medical Congress, on the symptomatology and diagnosis in spinal traumatisms involving the osseous frame-work, in which he deprecated operative treatment of fractures of the spine. Cases are reported by Detweiler, of Williamsport, Pa. [80 Dec.15,'93]; Piéchaud [188 June 3,'94]; Oliver, of Cincinnati [19 June 23,'94]; Brook, of Ellsworth, Ohio [222 Feb.,'94]; Herrick, of Troy [9 Mar.31,'94]; Smith, of Rochelle, Ga. [207 Feb.,'94]; Myerle, of Brooklyn [157 Oct.,'93]; Roberts, of Philadelphia [9 Mar.10,'94]; Wyeth [96 Aug.,'94]; Allingham [22 Feb.7,'94]; and Caselli, of Genoa. [59 May 5,'94]

Goldscheider [41 June 4,'94; 2 Aug.18,'94] discusses paraplegia after fractures of the spinal column, and states that operative interference should not be undertaken in recent cases except where a fracture of the arch has allowed of the piercing of the cord by a fragment, or when, after fractures, the paralysis does not improve and deformity is present, pointing to fracture and depression of an arch. If a fracture of the body is suspected, operation is of no avail. Removal of the blood-clots from the canal is not absolutely necessary.

Walton, of Boston, [99 Dec.8,'93] reports a case of cervical dislocation in a boy of 10 years. Ether was administered and the vertebræ first unlocked by bending the head diagonally backward and toward the left, and thus rotating it into place. No force was required, reduction being immediate and complete; no click was heard and the next day all the motions of the head were perfect. Beach, in a letter printed in the same article, records a case of spontaneous reduction. Cryer, of Philadelphia, [19 May 26,'94] presented to the Surgical Section of the College of Physicians of Philadelphia a specimen showing a cured fracture of the atlas and axis, which were held together by bony union. The odontoid process was displaced almost into the centre of the spinal canal of the atlas. The transverse ligament had probably been torn and the patient must have lived for some time, although there must have been considerable compression of the spinal cord. Berezkine [164 June 7,'94; 80 Aug.15,'94] instances a successful intervention for complete paraplegia following a gunshot wound in the præcordial region.

Concussion.—Gussenbauer, of Prague, [13 May 15,'94] details the history of a patient who had received a severe blow in the region of the eleventh and twelfth dorsal vertebræ. Symptoms appeared three-quarters of an hour after the injury and increased, but after three days they began to diminish, though full function was not restored until eighteen months afterward. The author believes that these symptoms are not due to concussion of the cord, but to extravasation of blood, and that the prognosis depends upon whether a traumatic myelitis is set up or whether there is absorption of the effused blood.

Pott's Disease.—Thorburn, of Manchester, [2 June 30,'94] discusses the pathology of vertebral caries. Paraplegia may be produced in one or other of the following ways: Not usually, but rarely, by the kyphosis; by fractures of carious vertebræ; rarely by the bursting of abscesses; usually by granulative tissue, and, in a few rare cases, by tuberculous periarteritis. Recovery will usually occur after prolonged rest with fixation of the spine. Relapses are common and recovery rarely absolutely perfect. The indications for laminectomy are: steady increase in symptoms in spite of favorable conditions and treatment; the presence of symptoms which directly threaten life. The persistence of symptoms in spite of complete rest is the indication which has been most commonly adopted, but

such symptoms may persist for very long periods and then yield to absolute rest, and occasionally peripachymeningitis may remain and keep up paraplegia until the constricting tissue is removed; in posterior caries, severe pain; and, lastly, as children yield better results than adults, childhood.

Treves, of London, [22 Oct.4,'93] performed his own operation successfully on a woman of 38 years, who for two years had suffered from neuralgia and supposed uterine symptoms, evacuating a large spinal abscess arising from caries of the twelfth dorsal vertebra with destruction of the intervertebral disc between it and the first lumbar.

Roberts, of Philadelphia, [96 May,'94] records an unusual case of primary tuberculosis of the laminæ and spinous processes of the vertebræ. The patient, a girl of 10 or 12 years, had paraplegia with incontinence of urine and fæces, and slight scoliosis in the dorsal region with tenderness on pressure. Operation was performed and the disease located. During the removal of the diseased arches the patient's condition became very serious, and she died of shock and hæmorrhage just as she was being taken from the operating-table. The bacteriological examination revealed the bacillus of tuberculosis in nearly all the surrounding structures.

Binaud and Crozet [451 May,'94] report two new cases of laminectomy for paraplegia of Pott's disease. In one, fungi were found external to the dura mater and easily removed, the cord underneath being healthy; in the other the dura mater was softened and lacerated under the fungous condition, and pus flowed freely from an opening on both sides of the cord. The first patient made a good recovery, but in the second the result was not so favorable. Park, of Buffalo, [9 May 19,'94] in a clinical lecture on paraplegia from Pott's disease, advocates careful use of the conservative plan before resorting to operation. Isnardi [739 Jan.,'94] operated upon a child, 6 years of age, with paraplegia. The disease was in the dorsal region, the apex of the kyphosis being the fifth dorsal vertebra. The cord was found acutely flexed, and recovery of function was very rapid after laminectomy.

Tumors of the Spine.—Thorburn, of Manchester, [2 June 30,'94] says that the only rule in cases of pressure-lesions arising externally to the spine or in the vertebræ is that pressure on the cord does not *per se* contra-indicate operation, and that we must be guided by

the general rules of surgery. He suggests the possibility of good results following operation for hypertrophic cervical pachymeningitis. Sänger and Krause [336 Aug. 4, '94] report the case of a man, 42 years of age, with symptoms of intra-spinal compression. Laminectomy was performed on the arches of the fourth to the seventh dorsal vertebræ. The dura was tense, and when incised the cerebro-spinal fluid escaped in a jet. On lifting the spinal cord a tremor appeared on a level with the sixth dorsal vertebra and between it and the dura mater. It was of grayish-red color, smooth, compact, twenty-seven millimetres long, eighteen millimetres thick, and ten millimetres broad, occupying the place of the ligamentum denticulatum, compressing the cord to the left. It was easily removed, but the patient, who had had bronchitis prior to the operation, succumbed to bronchitis and hypostatic pneumonia.

Leyden [41 June 14, '94] reports two cases of tumor of the spinal cord, and believes that the results are more favorable the earlier the removal is undertaken. Turney and Clutton, of London, [6 Feb. 17, '94] report a fatal case of tumor pressing on the spinal cord, in which operation was undertaken and the patient died. The tumor was diagnosed as occupying the level of the tenth dorsal segment, and on opening the arachnoid a growth was found over the eighth dorsal vertebra; it was soft, and extended nearly out of sight beneath the laminæ of the eighth dorsal. It was almost entirely on the left side, with its centre in the situation of the roots of the tenth dorsal nerve, producing a deep depression in the cord. The posterior roots of one of the spinal nerves were removed with the tumor. The patient improved for a few hours, then suddenly collapsed, and died about forty-eight hours after the operation, pus being found throughout the wound-area and in the spinal canal. Ferrier and Cheyne, of London, [6 Mar. 24, '94] also report a fatal case. The patient was obliged to assume a peculiar sitting posture, propped up by pillows, with the thighs flexed on the pelvis and the knees bent. Any attempt to lie down or to change his position induced violent extensor spasms of the legs and severe pain shooting up the back. Laminectomy of the sixth to the tenth dorsal vertebræ disclosed a subdural tumor extending from the sixth to the eleventh vertebræ. This was removed without the slightest difficulty or injury to the cord or nerves. The patient died within thirty-six hours, and at the autopsy tubercular infiltration was found in

both apices and pyelitis in both kidneys. The tumor was a fibromyxoma.

Spinal Hæmorrhage.—Park, of Buffalo, [9 Apr.7,'94] showed a patient, at the Buffalo General Hospital, who had been struck in the back by the loaded bucket of a dredging machine, becoming helpless at once. In the evening there was an alteration in the contour of the spinous processes of the ninth and tenth dorsal vertebræ, extensive bruising, and a large hæmatoma on the right side. The next morning he was much improved, and continued to improve steadily, although nothing was done except to catheterize him carefully.

SURGERY OF THE NERVES.

Keen and Mitchell, of Philadelphia, [19 Mar.24,'94; 451 May,'94; 2 July 14,'94] report a case of removal of the Gasserian ganglion, as the last of 14 operations (1 being excision of the whole of the right upper jaw) in thirteen years for tic douloureux. The Hartley-Krause operation was done and was very difficult, as the patient proved to be a bleeder. Keen publishes statistics of 40 cases of removal of the ganglion, 19 by Rose's method, with 17 recoveries and 2 deaths, —a mortality of 10.5 per cent.; Hartley's method, 19 cases, 17 recoveries, 2 deaths,—mortality 10.5 per cent.; Horsleys' method, 1 case, no recoveries, 1 death,—mortality 100 per cent. Method unknown, 1 case; result not known. We see, therefore, that of the 40 cases 6 died and 34 recovered, and in none has there been any return thus far reported, except a partial recurrence in one of Rose's earlier cases. He believes that if this operation should prove to be a final cure in cases of tic douloureux it should be the first operation recommended for severe cases, provided that time and experience enable us to diminish the present relatively large mortality.

Fowler, of Brooklyn, [59 June 16,'94] operated after the Hartley-Krause method, in a woman with intractable left-sided trigeminal neuralgia of nine years' standing, which had resisted all methods of treatment. The middle meningeal artery was torn at the foramen spinosum and a free hæmorrhage occurred, which was arrested by an aseptic plug driven into the foramen. Following the section of the third branch of the nerve, a copious venous flow occurred, and further efforts were abandoned on account of the patient's

condition. One hour and twenty-five minutes were occupied in operative manipulation. Infusion of a saline solution was used toward the end, but after leaving the operating-table the pulse fell, in the course of four hours, from 140 to 80, and the respirations fell suddenly to below 20. In five minutes they fell to 10, and in five minutes more ceased altogether, the pulse continuing at the wrist for a half-minute or more after respiration ceased. Attempts at artificial respiration were useless. The second case was a man of 42, who had suffered for thirteen years. The external carotid artery was ligated at a point just above the facial and occiptal, with a view of shutting off the blood-supply to the internal maxillary and its middle meningeal branch. The Hartley-Krause operation was then performed, and the Gasserian ganglion was so intimately adherent to the dura that it was impossible to isolate it. There was only very little bleeding from the small venous branches as the dura was raised from the base. One hour and five minutes were occupied in the operation. The patient was discharged cured at the end of fourteen days. Bell, of Montreal, $\frac{282}{\text{Feb.,'94}}$ exhibited to the Montreal Medico-Chirurgical Society a woman upon whom he had performed Krause's operation. Tiffany, of Baltimore, $\frac{251}{\text{Jan.,'94}}$; $\frac{96}{\text{Jan.,'94}}$ reports four cases of Hartley's operation. In two the middle meningeal artery was divided whilst making the bone-flap, and was tied by passing a silk ligature through the dura in front of the tear by means of a curved needle. In order to gain more room after opening the skull the dura mater was incised and the cerebro-spinal fluid allowed to run away. After this the brain was found lying away from the field of operation, the dura lying wrinkled upon its surface, and ample room was afforded for uncovering the nerves and exposing the ganglion. In uncovering the parts of the nerve, the second portion was first laid bare and a ligature passed around it with a curved aneurism-needle. The dura was then separated from it backward, and thus the third division and ganglion were exposed and a ligature passed around with a needle. Gentle traction was then made on the ligatures, and with a long, sharp curette the nerves were separated and the adjacent portion of the ganglion removed. Next, the second and third portions were divided at their foramina of exit from the skull. The first division was exposed, but not interfered with.

Eskridge and Baker, of Colorado, $\frac{5}{\text{Mar.,'94}}$ report a fatal case

in a man, aged 52, who died of shock thirty-eight hours after the operation, which was done according to the Andrews-Rose method. Stewart, of Pittsburgh, [9 Aug.11,'94] operated on a woman, 48 years of age, according to Rose's method. Complete recovery ensued.

Taylor, of Philadelphia, [19 Mar.31,'94] read a paper, before the Philadelphia County Medical Society, on some anatomical and surgical relations of the parts involved in the operation of intra-cranial neurectomy of the fifth pair of nerves and removal of the Gasserian ganglion. He examined the interior of twenty skulls in order to establish by accurate measurement the distance between the foramina of exit of the second and third branches, and their relationship with the foramen spinosum, the carotid canal, and the depression or fossa for the ganglion. In the majority of instances the foramen spinosum, with the middle meningeal artery, is far enough away from the foramen ovale and the third branch of the nerve to enable us to successfully cut the latter without wounding the blood-vessel; but the spinosum may be so nearly in line with the ovale that to reach it without wounding the middle meningeal artery would be impossible. For this reason, whenever the exposure of the third branch of the nerve is at all difficult, the surgeon should at once search for and ligature the artery, and cut it across before attempting to find the nerve. This is not very difficult, and will at once give much greater freedom of action.

O'Hara, of Melbourne, [285 Oct.15,'93] operated with success on a woman who had suffered with neuralgia for five years. Rose, of London, [6 Mar.17,'94] reported two cases of the Braun-Lossen method of operation for trigeminal neuralgia. Both cases had remained free from pain up to the time of the report. The same surgeon operated on a man of 69 for intractable neuralgia of the fifth nerve, according to the Hartley-Krause method, but the report does not give the result. Bernabeo, of Naples, [589 Sept.26,'93] has also performed neurectomy of the second branch of the trigeminus, in the pterygo-maxillary fossa at the foramen magnum rotundum.

Robson, of Leeds, [2 Nov.18,'93] reports a case of Horsley's operation of neurectomy of the inferior division of the fifth nerve for epileptiform trigeminal neuralgia. The patient was a man of 60, who had suffered for sixteen years, and a series of minor operations had been performed from time to time with temporary relief. The

author states that the operation is somewhat difficult on account of the depth of the wound and the proximity of the internal maxillary vessels, which are troublesome to ligature in a deep wound with little space for manipulation. He would therefore reserve the operation for those cases in which the more simple division of the nerve at the usual site had failed.

Link, of Lemberg, [336 July 7,'94] describes a case of trigeminal neuralgia in which a previous neurectomy had failed. Success followed resection of the second branch of the nerve at the foramen rotundum, the opening being made through the spheno-maxillary fossa. To avoid trismus, so often seen in this operation, he advises avoiding the temporalis tendon as far as possible and cutting instead the anterior tendinous margin of the temporal muscle and drawing the muscle backward by means of a blunt hook.

Monestié [220 Apr.28,'94] reports a case of resection of the frontal, nasal, ethmoidal, and superior maxillary nerves by the Lossen-Braun-Ségond method, with cure lasting up to the time of the report,—about ten months. Krönlein [214 Aug.1,'94] reports a successful application of his retrobuccal method of exposing the third branch of the trigeminal nerve.

Reineking, of Sheboygan, Wis., [451 Feb.,'94] describes a case of severe neuralgia of some of the branches of the ophthalmic and superior maxillary branches of the trifacial nerve, accompanied by less severe, but equally obstinate, neuralgia of the great occipital. The nerve was exposed at its emergence from the supra-orbital foramen and thoroughly liberated by chiseling away a small portion of the ridge and separating it from its surroundings as far back as possible. A thick thread was tied around the nerve for the purpose of making traction and the branches of distribution to the muscles and skin of the forehead were followed up by dissection. After the trunk was isolated as far back as possible, it was seized with forceps and slowly twisted until it gave way. The same procedure was gone through with for the infra-orbital nerve. Special stress is laid on the necessity for dissection and extraction of the peripheral branches, and on slow torsion and gentle stretching of the central stump until it gives way, in cases of this kind. Gangolphe [211 July 22,'94] pursued this plan in the infra-orbital nerve, the patient remaining well for a considerable period. Goris, of Brussels, [868 July 14,'94] reports a successful case of resection of the infra-orbital

nerve in the spheno-maxillary foramen. Hearn [144 Dec.,'93] reports a case of neurectomy of the same nerve, in a woman of 73, in which there had been no return of the pain for five months.

Francis, of Hull, [451 May,'94] reports a case of cure of spasmodic torticollis by section of the spinal accessory nerve. Willard, of Philadelphia, [451 Apr.,'94] in a lecture on nerve-suturing, degeneration and regeneration following section, says that functional restoration is possible. The closer the apposition, the more speedy and complete will be the restoration. Union is accomplished chiefly by the reaching out and development of nerve-fibres from the divided proximal end, these fibres pushing their way across the connecting-link of fibrous tissue. Engrafted nerve-tissue or flaps cut from the nerve may serve as a frame-work for new tissue, or may produce embryonic nerve-fibres capable of assisting in reunion. The discussion reported last year, in regard to restoration of function in severed nerves, in the French Academy of Medicine (see ANNUAL, 1894, vol. iii, A–72), is continued this year, Herzen, Vanlair, and Worton having also taken up the question.

McLeod [2 Feb.17,'94] read a paper on nerve stretching and splitting in localized interstitial neuritis, leprous and otherwise. The circumstances connected with leprous neuritis which countenance operation are: the interstitial character of the inflammation; the limitation of the lesion as regards both the length and thickness of the nerve; the site of the lesion, which usually attacks superficial nerves in places where they are easy of access, and the pathological results; the evidence, in some cases, of a tendency to limitation and an effort toward resolution; indications of existing tension and pressure; and the progressive character of the malady in intensity and area. The operation of nerve-stretching has been followed by decided relief in a large proportion of cases. Kalinowski, of Moscow, [100 Sept.20,'94] reported to the Surgical Society of Moscow three cases of wounds in the nerves of the neck during the removal of tumors in that region. In one case the pneumogastric was cut, producing an increase in the number of respirations. The pulse was disturbed and the chloroform had to be discontinued. In two minutes the conditions were again normal. In the second and third cases the pneumogastric was also cut.

Lewin and Boer [866 June,'94] report the results of numerous carefully-performed experiments upon rabbits to determine the effect of

contusion and extirpation of the cœliac ganglia. Their conclusions are that the cœliac ganglia are among the most sensitive organs of the entire body, and that after injury a compensatory hypertrophy and vicarious action of the remaining portion takes place. Neither crush nor extirpation of the ganglia is followed by rapid death. One of the main symptoms resulting was paresis of the intestine, usually with diarrhœa and pronounced tympanites. The cœliac ganglia seemed to be most necessary to life, as no other organic changes were found in the animals which died some time after the operation.

Hacker [22, Dec. 13, '93] and Ciallet [80, July 15, '94] report cases of suture of the median nerve with complete restoration of function. Finotti [866, Mar., '94] united the ends of the radial nerve by suture in a case in which it had been divided by the sharp edge of a fragment in a fracture of the humerus. The operation was performed six weeks after the injury, and the function was completely restored. Stimson, of New York, [96, Jan., '94] presents a case of suture of the divided ulnar nerve with rapid return of function. The day following the suture the patient could move the hand as well as ever. Anæsthesia in the fingers also rapidly diminished so that by the end of the week one could only say that sensation was somewhat duller than normal. It was presumed that the prompt return of nerve-power could not be attributed to primary union of the divided nerve, but to compensatory supply.

Verneuil, of Paris, [14, July 4, '94] operated on a man of 75 years, who had gangrene with great pain of a neuralgic character following the course of the great nerve-trunks. He made an incision in the popliteal region, resected the internal and external popliteal, the internal saphenous nerves, and the internal saphenous at the left of Hunter's canal. The next day the pain had entirely disappeared, and a month later the gangrene was limited and the general condition improved. Quénu then amputated the limb with the thermo-cautery. Recovery took place.

Morton, of Philadelphia, [96, Feb., '94] removed a tumor from within the sheath of the sciatic nerve of a patient 42 years of age. The fibres of the nerve were spread out on the growth, which was about the size and shape of a large goose-egg, while the tumor proper was separately inclosed in a capsule within the sheath. A few nerve-fibres at the proximal and distal extremities entered the

tumor and had to be cut. The wound was closed without drainage, and for two days there was some pain in the whole sciatic distribution, especially in the region supplied by the external popliteal, but no loss of power ensued. All pain disappeared in forty-eight hours. Potter [856 Oct.,'93] stretched the sciatic nerve for sciatic neuralgia in a woman 25 years of age. The time that has elapsed since the operation, however, is not stated, and hence it is not known whether a cure persisted or not. Pratt, of Dublin, [16 Sept.1,'94] sutured the sciatic nerve in a boy, aged 16 years, who had received a lacerated wound of the right thigh. About one inch of the nerve had to be resected and the nerve stretched before the sutures could be applied. Cutaneous sensibility was completely restored, and muscular power also to a considerable extent.

Podres [21 May 19,'94] considers that among the forgotten indications for nerve-stretching are amputation neuromata, bone-callus neuromata, and neuralgias.

Spisharnij [21 May 19,'94] advises uniting every sound nerve-trunk, even though some time has elapsed since the injury. Both direct and indirect sutures should be employed. In injuries to the radial, more than any other nerve, sensibility returns, while there is motor paralysis after uniting them. Restoration of function is about equally rapid in both upper and lower extremities. In large injuries tubulization (decalcified-bone tubes) should be used.

Lüning [214 Nov.15,'93] reports a case of recovery following a traumatic paralysis of the brachial plexus, an apparatus preventing the subluxation usual in these cases being used, with massage and electricity,—the constant current to the nerves and the faradic to the muscles. At the end of a year function was restored. A second case of traumatic paralysis of the radial is also reported, in which operation revealed a neuroma at the point of injury in the arm; this was removed and function was gradually restored.

THORACIC SURGERY.

By J. McFADDEN GASTON, A.B., M.D.,
AND
J. McFADDEN GASTON, Jr., A.M., M.D.,
ATLANTA, GA.

Disorders of the chest calling for surgical interference are usually complications of disease which at the outset come under medical treatment, such as pleurisy, pneumonia, pleuro-pneumonia, or other inflammatory modifications of the thoracic viscera. The exact stage at which these affections pass from the domain of medicine to that of surgery is not well defined, and there seems to be a tendency of late to revive the active use of medication in serous effusions within the pleura rather than resort to strictly surgical measures. If the distinction is established upon the basis of functional and organic changes, recognizing the former as limiting the sphere of the physician and the latter that of the surgeon, no question need be raised as to the mode of treatment. It is very evident that surgical pathology embraces cases requiring the use of medication as well as that of instruments. Observation of the results of diseases and injuries involving the mediastinum demonstrates that operative procedures may here be carried into the various portions with a fair prospect of affording relief to some pathological conditions heretofore regarded as beyond the reach of surgery. Experimentation on animals, though insufficient as a test, has still shown the feasibility of surgical interference in this comparatively unexplored region. If animals can survive traumatism of the mediastinum from the front and rear of the thorax, as verified by experiments of Le Moyne Wills, of Los Angeles, Cal.; De Forrest Willard, of Philadelphia; Levy, of Berlin; and Zakharevitch, of Russia, it is evident that operations may be undertaken for the relief of mediastinal tumors, hydatids, and other morbid developments of this space walled in by the folds of the pleura in the central portion of the human thorax. We cannot as yet give

a satisfactory solution of this question, but it is demonstrated, by clinical observation upon the human subject, that diseased structures of the chest, like other parts of the physical organism, are more tolerant of surgical interference than when in their normal condition. It is therefore inferred that operations upon diseased chest-walls and lung-tissue are warranted in all such cases as have proved safe in the experiments upon dogs and rabbits. Again, it is not a necessary consequence that operations upon the diseased structures of the human chest should prove hazardous because experiments on inferior animals in a healthy state have been unsatisfactory or have turned out unfavorably.

ŒSOPHAGUS.

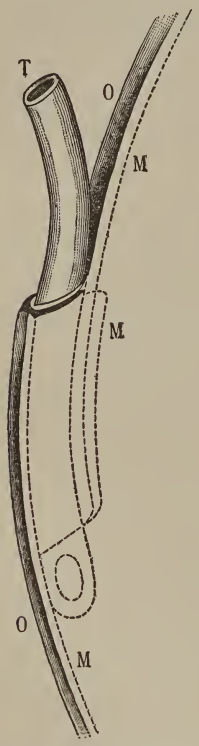
Stricture.—In our own experience within the past year there have been two cases of œsophageal stricture in young children who had accidentally drunk lye-water. The first case was too far advanced for operative interference and died within a few hours after it was presented for relief. The second case was that of a mulatto boy, 3 years of age, who was brought to the office several times. A gutta-percha sound was inserted as far as the point of the stricture, but it was impossible to pass beyond. As the child swallowed liquids with more facility for some time after each sounding the intervals between the operations were lengthened, the longest time thus elapsing being two months. The child fattened and seemed to be improving. Some difficulty in swallowing came on, however; the patient was brought back, and a small œsophageal sound was passed through the stricture for the first time. No further dilatation has been necessary since, but the case may ultimately require operation.

The case of Samuel, of Louisville, $\frac{1150}{\text{Apr.,'94}}$ shows how long a child may live after having swallowed lye-water before a stricture is perceptible, and after it is recognized how long even a stricture of the smallest calibre is borne by the system. It was nearly five months before an operation was done; the child was saved and is now living, six years after the operation. Samuel performed gastrostomy in two stages: he first stitched the walls of the stomach to the abdominal walls; after six days, when union had taken place, he made a small hole in the stomach with a tenotomy-knife while holding taut the two guiding sutures previously inserted. In this

aperture a piece of rubber tubing was introduced, and 4 fluid-ounces (130 cubic centimetres) of milk poured through this tube every four hours. Restoration of the œsophagus followed, due to the rest afforded by the artificial opening into the stomach. The child passed through a period of violent coughing accompanying measles three months after the operation, thus thoroughly testing the adhesions. The operator calls attention to the following features of the operation: "1. The ease with which fluids passed in a very short time after the completion of the first stage of the operation, which was probably due to the traction upon the stomach and œsophagus, causing a straightening of the strictured portion of the gullet. 2. The rapid improvement that took place when she was allowed to chew her food and wash it into her stomach with fluids (milk and water). I am aware that the experiment of Hanford does not bear me out in this statement; but, nevertheless, the improvement in strength and weight was threefold greater after this method of feeding was adopted. 3. The fact that after feeding through a tube for the period of two and a half years the stricture, without subsequent dilation, has become pervious and she is able, at the end of four and a half years, to eat the ordinary diet of her home. 4. The fact that the bougie becomes of doubtful benefit, and that, as it is not free from great irritation and danger, it should be withheld, and gastrostomy not delayed beyond the period when obstruction to solid food is complete. As gastrostomy is an easy and safe operation, offering the only permanent benefit, we would do well to follow the suggestion of Madyl, that in children who have swallowed corrosive fluids and substances it would be proper to propose an immediate gastrostomy."

M. B. Herman, of Memphis, Tenn., $\frac{74}{\text{Aug.,'94}}$ reports a case of gastrostomy for malignant disease of the œsophagus: H. B., male, aged 48 years, began to have pain near the sternum in swallowing, and finally could not swallow a single drop. The preparation for the operation consisted in the hypodermatic injection of $\frac{1}{60}$ grain (0.0011 gramme) of strychnine sulphate and 10 minims (0.65 cubic centimetre) of tincture of digitalis in brandy every four hours for the twenty-four hours previous to the operation. This stimulation of the heart enabled him to rally well from the anæsthetic. An incision about two and a half inches in length was

made immediately below and parallel with the left costal arch, down and through the peritoneum. The anterior wall of the empty stomach was transfixed with two long steel pins, while the peritoneal covering of the stomach was securely sutured to the peritoneum, fasciæ, and skin by one row of interrupted silk sutures, and then loosened; the wound was packed with iodoform gauze. On the fourth day, under cocaine, an incision one-quarter of an inch long was made into the stomach and a silver tube, with a rubber tube attached, inserted. Five weeks after the operation there was no leakage and the patient was improving.



VALVULAR GASTROSTOMY. DIAGRAM SHOWING THE RELATIONS OF THE TUBE TO THE PARTS. (ANDREWS.)

T, the tube; *O O*, the outer wall of the stomach; *M M M*, the mucous membrane.

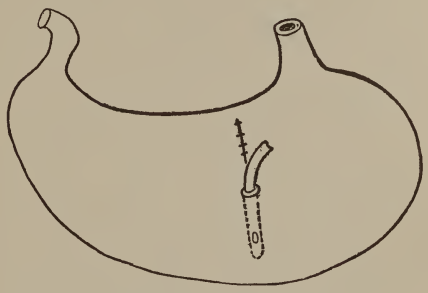
Journal of the American Medical Association.

Another case of œsophageal stricture is reported by Duncan, of Kyneton Hospital, Australia, [285 Feb.15,'94] due to a malignant growth. He performed gastrostomy by the method of Howse, in two stages, and the death of the patient, from exhaustion, causes him to believe it unwise to await adhesions before opening the stomach in malignant cases and when immediate relief is necessary. The post-mortem examination showed the obstruction to be one and a half inches from the cardiac orifice, with ulcerations extending into the peritoneal cavity.

Edmund Andrews and E. Wyllys Andrews, of Chicago, [61 May 19,'94] describe a new method of valvular gastrostomy with a mucous-membrane lining. This device serves the purpose of preventing regurgitation of the food which has been poured or injected into the tube. Leakage is prevented and the tube may be removed, as the procedure furnishes a valvular orifice obtained by taking advantage of the gastric mucous lining. In other words, a rubber tube, an ordinary No. 10 velvet-eyed English soft-rubber catheter, becomes part of the wall of the stomach by intrusion of its eyed

extremity under the gastric mucous membrane, the latter being dissected up in a quadrangular form so as to encircle it. The muscular flap being raised, an inch of the rubber tube is allowed to enter the cavity of the stomach. The whole tube may be removed soon after feeding or simply inserted at intervals for the purpose of dilating the orifice. The feeding may be usually accomplished by means of a syringe through the tubular fistula thus formed. (See illustration.)

A. Tietze [69 Apr.26,'94] reports five cases of œsophageal stricture. He combined œsophagotomy with gastrostomy in two of the cases, and kept up continual dilatation by means of a tube passed into the wound in the other three after performing gastrostomy. He prefers external œsophagotomy to internal, in view of the danger from the septic substances internally. Before attempting œsophagotomy after gastrostomy, it is well to resort to catheterization through the stomach.



SKETCH OF THE STOMACH WITH THE TUBE IN POSITION. (ANDREWS.)

Journal of the American Medical Association.

Albers, of Berlin, [4 May 28,'94] presented to the Berlin Surgical Society a paper describing a cannula for fistulæ of the œsophagus. It is not unlike the tubes used in tracheotomy. Its curve is the same, while a flange or disc encircling the tube contains openings through which a string or bandage may be passed. Silver or aluminium may be used in the manufacture. A patient exhibited by Zellar had refused an operation for the removal of a large carcinoma of the œsophagus and succeeded in getting a tube of this kind into the œsophagus and feeding himself. The fistula finally became so small that he was unable to use the same tube.

Foreign Bodies in the Œsophagus.—G. Fischer, according to H. P. de Forest, [96 Nov.,'93] has reported one hundred and twenty cases of œsophagotomy from various sources, beginning with the year 1738. The rarity of the operation even at the present time is shown by the fact that Billroth leads the list with an experience of eight cases. Krönlein, of Zurich, has had six cases, which are described

in detail as follows: Case 1. Œsophagotomy four days after the lodgment of a sheep's tooth in the gullet; cure. An incision was made in the anterior border of the left sterno-cleido-mastoid muscle from the level of the thyroid cartilage nearly to the episternal notch. The platysma and fasciæ were separated, the large vessels drawn aside, and the omohyoid divided. The finger was then worked carefully through the connective tissue between the carotid and the thyroid gland, passing behind the trachea down to the side of the œsophagus. The opening of the œsophagus was facilitated by the introduction of a silver male catheter through the mouth. An incision three centimetres long was then made in the œsophagus and the edges retracted. The finger was introduced into the œsophagus, the mucous membrane of which was greatly swollen, and the tooth was carefully removed. It was two-tenths of a centimetre long, two centimetres wide, and one centimetre thick. It had become firmly fixed by the penetration of its grinding-points. The operation was attended by very little loss of time or blood, while the use of carbolic-acid solutions rendered the proceeding antiseptic. The upper portion of the skin-incision having been closed, a drainage-tube was placed in the lower angle, and the rest was treated as an open wound. In a month the case was discharged. This case dates back to October 20, 1878.

Case 2. Œsophagotomy on the seventh day after the swallowing of a set of false teeth. Death on the fifteenth day as a result of secondary hæmorrhage from the right inferior thyroid artery. The first part of the operation was as before. The œsophagus was held by two silk loops, the catheter was withdrawn, and the œsophagus opened between the two threads. The finger of the operator was easily able to feel the set of teeth firmly imbedded in the wall of the gullet, about one centimetre above the left clavicle; the teeth had completely perforated the wall and projected through it. They were extracted by sequestrum-forceps with little bleeding.

Case 3. Œsophagotomy thirteen hours after the swallowing of a set of false teeth; cure. No catheter was used as a guide in this case. The œsophagus was held by means of double-pointed retractors and an incision three centimetres long was made in it. The edges of this wound were then held by two silk loops. The teeth were easily extracted by means of sequestrum-forceps.

Scarcely a month elapsed before the wound completely cicatrized, and the patient was discharged.

Case 4. Œsophagotomy on the eleventh day for the removal of a piece of bone; cure. This operation was in May, 1891.

Case 5. Œsophagotomy for the removal of a set of false teeth eleven hours after they were swallowed; cure.

In the last three cases it was possible to suture the walls of the œsophagus; this was done with catgut. The first two cases were so much more bruised and eroded at the point of the œsophagus, where the foreign body had lodged, that suture was inadvisable, and even with this precaution one case was lost by secondary hæmorrhage owing to the fact that the inferior thyroid artery had been included in the disorganization of the tissues.

In other ways these cases do not differ materially.

Case 6. Œsophagotomy after twenty-three hours for the removal of a piece of meat. Eight years previous to the present accident the patient had swallowed a piece of bone, for the removal of which œsophagotomy had been performed four days after the foreign body had lodged in the œsophagus. Three separate occasions before the time of the present operation, Nov. 21, 1893, a similar accident had happened, but each time the meat had been pushed into the stomach. Now, however, the whole lumen was so filled that even water would not pass into the stomach. Although this operation was done under the difficulties superadded by adhesions and a soft foreign body, it presented no marked difference. The inferior thyroid artery was cut between two ligatures in the last operation, and the superior thyroid vein was ligated after the first operation.

Krönlein does not operate when he can remove the foreign body otherwise, as shown by the cases in which foreign bodies were removed either with the "coin-catcher" of von Gräfe or with the œsophageal forceps. In six more cases the foreign body was dislodged spontaneously and was passed from the rectum.

For the examination of the gullet Krönlein first uses the ordinary English œsophageal sound, or else one with a metallic tip, when the foreign body cannot be felt with the finger. The metallic tip is to be preferred, as it is often possible to hear and feel the contact of the sound with the obstructing substance.

Cahier $\frac{243}{\text{No.2,'94}}$; $\frac{80}{\text{Apr.16}}$ reports the case of a sergeant whose false teeth

were lodged in the œsophagus in the region of the cricoid cartilage. Measurement showed that the foreign body was eight inches from the incisor teeth. Attempts at extraction by forceps were futile; therefore, external œsophagotomy was performed, the incision passing from the sternal notch to the upper and left border of the thyroid cartilage. The omohyoid was divided and also a portion of the sternothyroid. A longitudinal incision was made in the œsophagus, an œsophageal sound introduced through the wound, and the whole incision packed with iodoform gauze with the exception of the upper portion, which was sewed. The patient died three days later. Autopsy showed that the œsophagus had been ulcerated through by the foreign body and that the mediastinum had thus been infected. This case shows that immediate operation should be performed for such accidents, especially when the foreign body is irregular. Indeed, Terrier states that a physician should never leave a patient who has a foreign body lodged in the œsophagus without having in one way or another removed the obstacle. Immediate suture of the œsophagus may be practiced when the foreign body has been lodged such a short time that ulcerative inflammation has not occurred. Under other circumstances the wound should be packed. Arthur H. Wilson, of Liverpool, [187 July,'94] describes a fatal case of œsophagotomy for the removal of a tooth-plate. The extraction of the foreign body had been very difficult.

David Wallace, of Edinburgh, [6 Mar.24,'94] performed œsophagotomy and gastrotomy simultaneously for the removal of a denture with six artificial teeth. The diagnosis of the presence of the plate in the œsophagus was made only after repeated negative results by palpation, by the œsophageal olivary bougie No. 10 twice, and by a coin-catcher. The patient complained very much while these manœuvres were being carried out. She was, therefore, placed in a recumbent position and chloroform administered. Upon passing the olivary bougie for the third time, no impediment was found to its entrance into the stomach or on the way down, but while withdrawing it roughness was detected. The definite position of the plate was now found by the coin-catcher to be midway between the manubrium sterni and the stomach. In spite of this, however, and after a low œsophagotomy, no attempt at removal by forceps through the œsophageal incision was successful. An abdominal incision was immediately made, the stomach was incised, the

whole hand was passed into the stomach, and, by carefully directing the dressing-forceps, the plate was felt a few inches above the cardiac orifice of the stomach, and removed through the latter; the wound was sutured with silk by a modified Czerny-Lembert suture. A small piece of iodoform gauze was inserted into the œsophageal opening after suturing the latter with catgut. Mania supervened before final recovery, and some doubt existed as to whether this complication was due to iodoform poisoning or to the effect of lactation. At any rate it became necessary to use a stomach-tube; as the milk when swallowed, as it was at first, leaked out through the œsophageal opening. The operation was performed on July 31, 1893; the œsophagotomy wound was completely cicatrized on September 8th, and she was dismissed on the 13th of the same month.

FOREIGN BODIES IN THE AIR-PASSAGES.

James Bell [282, June,'94] exhibited to the Montreal Medico-Chirurgical Society, on May 5th, a short piece of lead-pencil, with a brass top, out of which the rubber had fallen, that he had recently removed from the lower division of the left bronchus of a child. A week before, a girl, aged 8, had been struck on the head while nibbling the pencil, and sudden inspiration, through fright, had caused the pencil to lodge in the larynx. The strangulation which followed nearly proved fatal. Her temperature rose to 104° F. (40° C.), respiration 50 to 60 per minute, pulse 140. The left lung was collapsed, pain was felt at the left nipple, and no air entered the lower lobe of the left lung. A low tracheotomy was performed two days after the accident by Bell, Stewart, and Roddick. The incision was made immediately below the isthmus of the thyroid gland, and an angular forceps with blades three and one-half inches long was used to reach for and grasp the pencil. On first attempting to seize it the forceps seemed to grasp the ring of the bronchus, and was therefore loosened, when a mass of blood and pus was thrown out of the incision. The metallic piece attached to the pencil was then easily grasped with the forceps, which had an angle of ninety degrees. The removal of the pencil in this way restored the respiratory sounds and saved the child.

Schild, of Magdeburg, [11, Nov.,'93] reports the case of a man, 20 years

old, who inspired a piece of acorn. An attack of suffocation resulted, followed by aphonia. The next day the patient became feverish over the left lung; no respiratory murmur could be heard, but dyspnœa was evident. A puncture over the left lung revealed purulent exudation. Resection of a rib was performed, and irrigation of the pleura and drainage effected. Two months later the foreign body was coughed out, cure eventually following a long convalescence.

Siebenman, of Basel, Switzerland, $\frac{214}{\text{May,'94}}$ describes two cases of foreign bodies in the air-passages. One foreign body, in a boy of 6 years, was a piece of walnut, which was coughed up after thirty days. The other case was a boy, 1 year old, who had inspired a coin, which had remained for four days in the air-passages. Attempts to extract it through the mouth having failed, the nasal cavities were examined, and it was found behind the septum, on the soft palate. Removal gave immediate relief.

Bernard Pitts, of England, $\frac{6}{\text{Oct.14,'93}}$ shows how enlarged and especially caseating mediastinal glands may press on the trachea or bronchus or ulcerate into the trachea or bronchus, and even the lung, œsophagus, or pleura. A gland of this kind was found by Wynn Wescott in the larynx, and another at the bifurcation of the trachea, with an ulcerated opening on the right side. A case of Gulliver is reported, in which the trachea was blocked by a tuberculous lymphatic gland, which suppurated into the trachea, causing dyspnœa and death.

FOREIGN BODIES AND LESIONS OF THE HEART.

B. Sengensse $\frac{780}{\text{Sept.,'94}}$ relates a case in which a needle-point penetrated the heart of a child, aged 3 years, and remained there thirty-six hours without serious result. He states that foreign bodies in the heart are so rarely met with that Fischer was only able to collect thirty-six cases. On the 21st of February, 1891, about 1 o'clock in the afternoon, his own patient fell from a carriage and drove into her side a needle which was sticking in her clothing. She became unconscious immediately, but after the lapse of a quarter of an hour regained her senses. Sengensse saw her five hours afterward. Her pulse was normal, but the child complained of a pain in her mouth. The next evening, however, she began to feel oppressed and to complain of violent pain upon respiration.

It was only in the early morning that it was discovered that there was a small opening in the skin, and the physician was summoned hurriedly. The sufferer then showed a small and quick pulse, an unusual amount of perspiration, and considerable respiratory pain. Sengensse examined the chest, and found a point to the right of the median line where there was an elevation which beat in unison with the heart, and distinctly separate from the rest of the chest. The end of the needle was found two or three millimetres behind the right border of the sternum, in the fourth intercostal space, a little below a line joining the two nipples. Upon dissecting down it was reached by the forceps and easily removed, its direction being from right to left and from above downward. On the following morning the pain and oppression had disappeared almost entirely, the palpitations were very slight, the pulse a little rapid but regular, and, on auscultation, no abnormal sound was heard. In all probability the right ventricle had been penetrated by the needle.

Seth N. Jordan, of Columbus, Ga., $\frac{2056}{'94}$ describes a case of penetrating wound of the pericardium. The patient, a girl 13 years of age, while working in a factory, was accidentally struck by a long bodkin used in weaving. It came from the machine with such force that the point penetrated her clothing and her side. A test of the inhibitory nerves revealed that the muscular coat of the heart was not penetrated, but that the pericardium alone had been involved. In view of this circumstance he removed the bodkin and hermetically sealed the wound. In a few days the girl was again able to work, and had suffered no inconvenience from the accident at the time of writing, October, over a month from the date of the injury, August 16th. The shock at the time was considerable, her pulse being rapid, but, upon the operator's grasping the bodkin, the pulse became very slow. It was this slowing of the pulse which revealed to his mind the experiment first made by Cion, on the frog, to demonstrate the existence of inhibitory ganglia at the junction of the auricle and ventricle. The bodkin was found to have penetrated two inches between the fourth and fifth ribs, leaving exposed four inches of the instrument. A peculiar, grating, leathery sound had been noticed over the region of the heart after the first day, but the temperature at no time exceeded 101° F. (38.3° C.). Hæmorrhage was not great.

In view of the fact that there was a hook on the end which penetrated the body, there was less danger associated with its entrance than would have been the case had the end been a sharp point, and yet there was much danger of lacerating the pericardium in extracting it. (See illustration.)

A case of gunshot wound of the heart, in the service of James Kerr, of Washington, is reported by James R. Church [9 Oct.27,'93]: "A white man, 67 years old, was brought into the receiving-ward of the Emergency Hospital, at 5.40 P.M., suffering from a gunshot wound of the thorax inflicted at 4.50. Upon his admission he was

PENETRATING WOUND OF THE PERICARDIUM. (JORDAN.)
Contributions to Operative Surgery.

in a state of collapse, the features pinched and pale, the body covered with a clammy perspiration, and the dressings over the wound stained with blood. The wound, which had been made by a pistol-bullet (32-calibre), was situated one and one-fourth inches below the mammary line and a little to the left of the centre of the sternum, and through it considerable blood had escaped. The pulse was almost imperceptible, the respiration fair, the mind wandering. The man was put to bed, the usual therapeutic agents were employed, and transfusion was performed, but the condition became steadily worse and death took place at 7.45 P.M. A post-mortem examination showed that the ball had pierced the sternum

just above the xiphoid cartilage, and entered the pericardium to the right and at the lower part. The sac was filled with blood, both fresh and clotted. The heart was pierced through the right ventricle, the anterior wound being one-half inch in diameter and the wound of exit five-eighths of an inch in diameter and ragged. The diaphragm was perforated and the omentum wounded in several places. The ball itself was lodged under the skin posteriorly between the ninth and tenth ribs. The hæmorrhage had been very severe, the pericardium being choked with blood, the pleural cavity containing a large quantity, and the peritoneal cavity considerable. The question which naturally presents itself, in view of such cases, is the possibility of some reparative measure. If a man can live for three hours with such an injury, it does not seem beyond the bounds of possibility that, with the advance of surgery, operative interference may some time be justifiable. It might at least be open to discussion whether a surgeon might not open the pericardium, clean out the clots, close the wound in the heart-wall, and give his patient a chance of recovery. It is no more improbable now than was the removal of a tumor from the motor area of the brain in the recent past, or the intra-venous injection of large quantities of fluid. In the "Index-Catalogue of the United States Army Medical Museum" there are reported 22 cases of direct injury to the heart, all of which lived over three hours; 17 lived over three days; 8 lived over ten days; 2 lived over 25 days; 1 died on the fifty-fifth day, and there were 3 well-authenticated recoveries. S. S. Purple, of New York, $\frac{1}{\text{v.14,pp.411,434}}$ gives an account of a recovery from a wound penetrating both ventricles (confirmation of the diagnosis by post-mortem nine years subsequently), and a tabulated list of 42 cases which survived injury for from thirty minutes to seventy days. C. E. Lavender $\frac{2057}{\text{p.104,'51}}$ reports a recovery from an incised wound of the heart, and C. L. Ford $\frac{59}{\text{p.173,'75}}$ cites a case of buckshot injury with recovery. From these statistics (and they are only a partial list of those recorded) it seems that the heart is capable of resisting, to a certain degree, traumatic interference and of fulfilling its function in spite of more or less injury. In the first place it remains to be seen whether the application of sutures would check the heart's action. If it would, which is not proved, the question of re-starting the heart would have to be settled. Hare and de Schweinitz, of Philadelphia, have done much work

in experimental cardiac surgery. Whether their results have been published I do not know, but they have demonstrated that the intra-venous injection of large quantities of air is not necessarily fatal. If, then, a heart may sustain a grave injury and perform its function for so long a period as five days, or even five hours, why should not some remedial measures be possible and allowable, as the present view is that all direct wounds of the heart are necessarily fatal sooner or later, and that no hope, or practically none, lies in a policy of non-interference?"

William Pepper, J. H. Musser, and John B. Deaver, of Philadelphia, [112 Feb.,'94] mention a case of pericarditis in which paracentesis of the pericardium was performed. A man, aged 21, was seized on the 26th of December, 1889, with symptoms not unlike influenza. After this he took a long ride in the cold, and was soon after prostrated, with a temperature of 104.2° F. (40.1° C.). Dyspnœa became such a prominent symptom that it was necessary to draw off some fluid from the pericardial region, and to finally incise and drain. Though much improved at first, the patient died on the 27th of January, about two weeks after the operation of paracentesis.

LUNGS AND DIAPHRAGM.

Injuries.—A man 30 years of age came under the care of Ninni, of Naples, [336 July 28,'94] suffering from a wound of the diaphragm. Resection of the portion of the eighth rib, which intervened, was found to be necessary, and the wound, which was twenty-five millimetres long, was enlarged. A wound two centimetres long was then found in the stomach and sutured according to Czerny's method. The wound was irrigated and the diaphragm also sutured. No drainage-tube was used. The outside walls were brought together by suture. The patient recovered. Two other similar cases followed by good results embolden the author to advise surgical interference in all cases of wounds of the diaphragm, preceded by resection of one or more ribs. The trap-door arrangement suggested by Delorme, Postempski, or Rydygier is advised as a means of partially and temporarily resecting the two or three ribs that may be necessary to gain access to the central or upper portion of the diaphragm. In ordinary cases very little more than ten centimetres of one rib are ever required. The first case reported by Ninni had received a stab in the left seventh

intercostal space soon after a meal, and great pain in the abdomen was felt as a result of the stomach-wound. In the other cases the viscera were not penetrated, but an artery of the mesocolon required ligation in one of them.

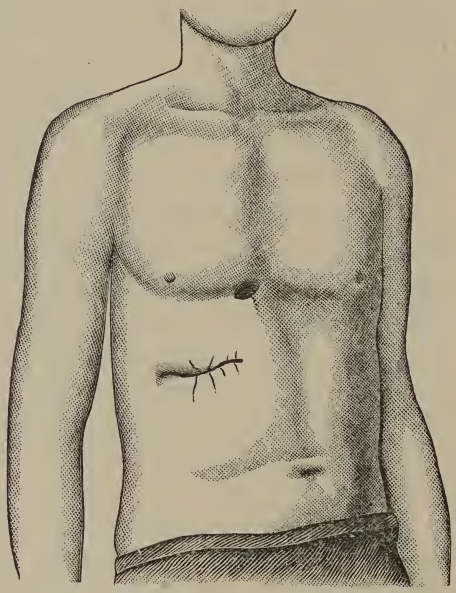
William Levy, of Berlin, [336 Aug.4,'94] describes a series of experiments performed on dogs showing that the cardiac orifice of the stomach may be successfully resected, and he advises its performance in cases of cancer. He became convinced of the practicability of the operation from results of resections of the pylorus, stomach, and intestines by Billroth, and from the frequent wounds tolerated by the stomach. He found that dogs survived resections of the cardiac orifice of the stomach, provided these operations were performed under strict antiseptic precautions and great care. The two vagi had to be cut, and the result was not so bad as might have been expected. The animals came out from the influence of an anæsthetic well, continued to eat and to defecate after the operation as before, the filaments that go to the vital organs continuing to serve their purpose. In his operations the author found the œsophageal branches of the gastric artery and vein, secured them with a clamp, and cut them between ligatures. He cautions against unwarily cutting into the pleural cavity. The chief cutting is done on the posterior surface of the œsophagus to detach it from the surrounding structures.

J. Houston Ball, of Wayland, Texas, [74 Aug.,'94] reports a case of pistol-shot wound of the chest in a pregnant woman, causing the death of the child and later the death of the mother, who passed into uræmic convulsions. The ball had entered the fifth intercostal space five inches to the left of the posterior median line, ranged neither up nor down, and had for its exit the fifth intercostal space, five and one-half inches to the right of the anterior median line. The ball passed through the lower lobe of each lung, necessarily producing an unyielding emphysema. The condition of the patient was such that she had regular labor-pains of sufficient strength to give birth to a fœtus of eight months.

D. D. Saunders, Jr., of Memphis, Tenn., [74 June,'94] describes a remarkable recovery from a penetrating pistol-shot wound made by a ball entering at the tenth rib on the right side, about the midaxillary line, and emerging just below the twelfth rib on the left side, three inches back of the midaxillary line. A laparotomy

was performed immediately after the injury, and quite a quantity of fluid and some clotted blood were found. The ball had perforated the liver. The abdomen was flushed with water and the wound closed with catgut sutures, after inserting a drainage-tube. In three months the patient had recovered completely from the effects, and an examination of the urine, which had contained blood, showed it to be normal.

Tumors.—F. Lejars [100 Mar. 1, '94] describes a case of pleural hæmatoma which was puzzling in point of differential diagnosis from abscess



Pleural Hæmatoma. Location Shown by Cicatrix. (Lejars.)
Gazette des Hôpitaux.

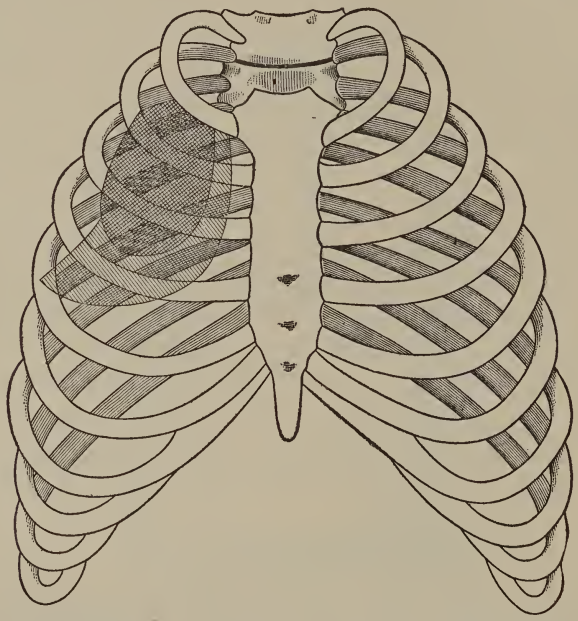
of the liver. The patient, a young man aged 23 years, was admitted to the Necker Hospital on June 16, 1892, with a history of a previous pleurisy of the right side, tubercular osteitis of the left side, and diarrhœa, the latter of one month's duration. His temperature was 102° F. (38.9° C.); his pulse was weak and frequent,—110. Upon physical examination it was found that the base of the chest on the right side was enlarged and elevated to a marked degree; the skin of the raised surface was œdematous, pressure there causing keen pain. A zone of dullness of seven inches corresponded to this prominence, and began at the false ribs,

ending at the nipple. Upon auscultation the vesicular murmur was found to be feeble, but without any other sounds. Behind and on the right there was dullness in the inferior fourth of the chest; the local respiration was obscure and free from râles. Five exploratory punctures were made with a Pravaz syringe, the first four showing only blood and the last blood mixed with grayish masses, which under the microscope were seen to be composed of leucocytes. When subjected to a bacteriological examination some diplococci were found, but no pneumococci.

An incision parallel with the lower ribs was made on the right side, and a large cavity filled with blood-clots was found. The masses were removed and the cavity thoroughly irrigated with borated warm water. The lungs were then seen to occupy the space, moving with more and more ease, until they had filled up much of the cavity. The diaphragm was distinctly made out. The whole incision, which was a long one, was sutured, with the exception of an opening for a drainage-tube. The stitches were taken out at the first dressing, five days after the operation. It was only necessary to treat a small fistula, and this healed up on the first application of Volkmann's curette, chloride of zinc, and iodoform gauze, on August 20th. In September the patient left the hospital. In the meantime the nucleus of tubercular osteitis on the left side had been curetted and thus completely cured. In November the patient wrote that he was about his usual active work.

Abscess.—J. J. Matignon, $\frac{360}{\text{Feb.,'94}}$ in describing a case of abscess of the lung operated upon by Baudrimont, at the Hospital St. André, expresses his preference for pneumotomy and resection of ribs. He takes a different position from that taken by Camille Moreau, and says, with Thiriar, that the operator had better err on the side of resecting too great a section of rib than too small a one. He quotes Cerenville, Ollier, Ehrmann, and Berger, however, to show that extensive resections are not without considerable danger to the heart and respiration. He also believes that carbolized water is not so safe an antiseptic solution for the pleural cavity as boric-acid solution, followed by dry dressings and iodoform gauze, while no operation of pneumotomy should be performed until the hypodermatic needle has localized the abscess and adhesions have taken place between the parietal and visceral layers of the pleura,

so as to prevent the entrance of pus into the pleural cavity. This may, however, be accomplished by sutures. Pneumotomy is perfectly safe when done in this way, as has been shown by experiments on dogs. Pneumotomy for abscess was performed twenty-eight times up to 1891, with a mortality of only 25 per cent. The case of Baudrimont is one of two operations of the kind for abscess done in France up to that period. The patient, a young man 29 years of age, who had had pneumonia from falling in water while he was in profuse perspiration, had been treated by



PNEUMOTOMY FOR ABSCESS OF THE LUNG. (MATIGNON.)
Archives Générales de Médecine.

blisters and internal remedies, but, having a series of relapses, finally developed a focus of pus. It was found, on auscultation, that the points of dullness did not correspond with any lack of respiratory murmur. Numerous râles and dry sounds of cavities were heard. Baudriment, noticing that the patient coughed up masses of different consistence and sometimes attended with pus, blood, and fœtor, thought there might be two cyst-like pockets communicating with each other. On January 27, 1891, he operated, making an incision of eight centimetres' length in the third intercostal space, parallel to the ribs. Having dissected back the

pectoral muscles, he denuded the second rib of periosteum and resected four and one-half centimetres of its anterior part, old resistant adhesions being found, with an abscess in the parenchyma of the lung at a depth of five centimetres. This he opened with the thermo-cautery, evacuated, and treated antiseptically. After two other operations the patient was completely cured in nine months.

Lopez [2, Apr. 28, '94] relates a case of incised wound of the seventh left intercostal space, followed by pneumocele. After ineffectual efforts at reduction two ligatures were passed round its base, the lung-tissue removed in a line with the wound, and the pedicle returned. The wound was closed with sutures, a drainage-tube was inserted, and sulphate of quinine administered internally. On the fifth day marked dyspnœa came on, which was found to be due to hæmopyothorax. The patient was placed on his side, when a quantity of sero-pus exuded. He made a good recovery and was discharged on the twenty-second day.

Holme and Valdemar [51, Aug., '94] report an interesting case of subdiaphragmatic abscess in a child 10 years old. Two months before being admitted to Queen Louisa Children's Hospital, in Copenhagen, she had been in apparently good health. The temperature on admission was 101.6° F. (38.7° C.), and afterward rose to 102° F. (38.9° C.). The liver could be felt about two fingers' breadth below the free border of the ribs. It was some time before a fullness in the epigastric region caused a diagnosis of subdiaphragmatic abscess to be made Eight hundred cubic centimetres (25½ fluidounces) of thick, greenish pus came from an opening, made under chloroform. The seventh rib was exsected and a drainage-tube inserted. The child was examined a year later, when nothing unusual was observed except dullness at the apex of the lung.

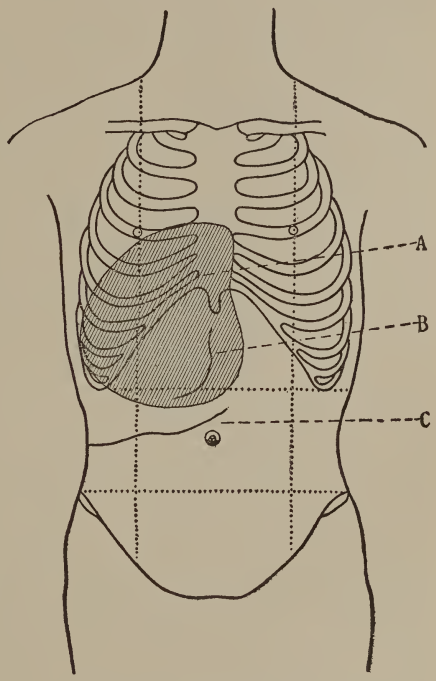
Rodman [224, May 5, '94] reported, before the Louisville Surgical Society, the case of a young man who suffered from septic pneumonia resulting in gangrene, as a consequence of a fall from a railroad bridge, in which he had sustained a fracture of the fifth, sixth, and seventh ribs on the left side. The blood expectorated showed that one of the ends of the ribs had wounded the lung, causing traumatic pneumonia, beginning with a temperature of 104° F. (40° C.), five days afterward; septic symptoms soon intervened.

On the twentieth day after the accident, four inches of the sixth rib having been resected, pus was encountered and evacuated. The abscess-cavity of the lung was packed with several yards of iodoform gauze in strips. The man recovered his health and strength.

A case of subphrenic abscess is reported by A. M. Wulff. [21 May 19,'94] The patient was received into the hospital on October 4, 1892. Eight days before he had been discharged from a hospital where he had recovered from typhoid fever. His symptoms consisted of weakness, paleness, high temperature, dullness in front of the left side of the cartilage of seventh rib and extending to the scapular region. There was very slight vesicular fremitus. The spleen was enlarged and palpable. The heart and liver were normal. Tympanitic sounds developing on the spot of dullness, a puncture was made and pus found in abundance in the ninth intercostal space. On the 2d of October of the following year he returned, and a partial resection of the tenth rib between the posterior axillary line and scapula was made; this gave rise to the discharge of flocculent matter containing cheesy flakes and pieces of spleen. The symptoms improved after this operation. The wound granulated kindly. The temperature was moderately high the whole time. The patient died on the 20th of December from a violent attack of pneumonia, contracted five days previously. A post-mortem examination was made and revealed endocarditis involving the mitral valve, right pleuritis, hepatization of the lungs, and strong adhesions between the lungs and the spleen, Two abscesses of the spleen were found, and fistulous communications which admitted air explained the presence of portions of spleen in the *débris*.

Lee Dickinson, of London, [2 Feb.3,'94] in describing two cases of subphrenic pyopneumothorax, says that by far the most frequent cases are to be found in gastric ulcers or duodenal perforations. In the case of the stomach the gas and pus collect beneath the left wing of the diaphragm, limited on the right by the falciform ligament. In the case of the duodenum the result is a similar collection to the right of the falciform ligament. He gives two cases in detail, one ending in recovery (see cut), the other in death, and also describes nine cases of incompletely circumscribed peritoneal suppuration associated with general peritonitis, and fifteen

cases of completely circumscribed peritoneal suppuration. The thoracic complications found in the majority of cases were empyema, pericarditis, and pleurisy; adhesions and perforations were frequent. Dickinson also reviews the cases of perforation which have been found post-mortem at St. George's Hospital since 1841, and notes the preponderance of simple gastric or duodenal ulcers, thirty-seven in number; the examples of circumscribed peritoneal suppuration from the same cases are twenty-four in number. The extravasation and peritonitis are more or less limited at first. The partiality of subphrenic pyopneumothorax is for the left of the abdomen. The symptoms found most prominently connected with these cases consisted in bell-notes over the affected area of epigastric region up to the nipple, compression of the diaphragm, cough, pain, swelling, to which are added other signs according to whether the appendix vermiformis or the liver is affected.



SUBPHRENIC PYOPNEUMOTHORAX.
(DICKINSON.)
British Medical Journal.

Israel, of Berlin, $\frac{22}{\text{Aug.,'94}}$ reports a case of dangerous pulmonary hæmorrhage for which resection of the thoracic wall was practiced. The opening into the thorax not only enabled the hæmoptysis and hæmorrhage to be stopped by local compression at a point of ulceration, and packing with iodoform gauze, but also allowed free access to the interior for the application of nitrate of silver, iodoform, ether spray, and tincture of iodine with calomel, to the pleura, which was thus cured, although tuberculous spots had been treated otherwise without success.

M. E. Kanel $\frac{31}{\text{Sept.5,'94}}$ describes a case of diaphragmatic pyo-

thorax in which the thorax was very tender to the touch, especially on the right and in front, in the second and third intercostal spaces. There were other tender points above the clavicle between the two insertions of the sterno-cleido-mastoid muscle, on the shoulder on a level with the right scapula, on the neck, and on a level with the diaphragm to the ribs. The respirations were 40 a minute and of the costal type. Inspiration was interfered with by pain. Expectoration was abundant, without any special odor. Although an exploratory puncture was negative, the post-mortem revealed diaphragmatic pleurisy.

Hernia of the Diaphragm.—Abel, of Berlin, $\frac{4}{\text{No.4,'94}}$; $\frac{2}{\text{Feb.17,'94}}$ describes an operation performed on a woman, 33 years of age, who was found to have her stomach, duodenum, great omentum, and a part of the colon in the thoracic cavity. The explanation of a definite diagnosis is that a congenital defect existed in the walls of the diaphragm, and that the physical examination of the chest disclosed the fact that the heart beat on the right side, while during attacks of indigestion there were signs of intestinal obstruction, collapsed abdominal walls, and distension on one side of the thorax. An incision through the abdominal walls, with traction on the viscera, was the only hope for relief, as a tube could not be inserted into the stomach. The incision made by Abel was ten centimetres in length and three inches below the left lowest rib. No amount of effort was sufficient to draw back all of the stomach through the opening in the diaphragm, and the patient died three hours and a half after operation. The stomach was found, upon post-mortem examination, to be distended to the size of a man's head, the opening being circular, but only seven centimetres in diameter, and sharp around the edges, so that nothing short of a long incision into the diaphragm could have availed.

Floyd W. McRae, of Atlanta, Ga., $\frac{2058}{\text{'94}}$ reported to the Southern Surgical and Gynæcological Association a case which is unique as regards the method of enlarging the diaphragmatic opening, but otherwise resembles that of Abel. The author gives the following account of his case, which first came under the care of Terrell, who reports the first part of the treatment:—

"'December 6, 1893, J. W. entered my office stating that he was cut, having walked to my office, a distance of about two hun-

dred yards from where he received the wounds. On examination, I found the following three wounds: (1) a knife-stab wound on lower margin of scapula; (2) one in back below scapula; (3) in the left side, 4½ inches from axillary, between fifth and sixth ribs, 3½ inches from left nipple obliquely, a cut about 1¼ inches long. The first two wounds were only superficial, but upon a closer digital examination by my brother, E. B. Terrell, and myself, the wound in side was found to have pierced through all the tissue and entered the thoracic cavity. I thoroughly cleansed the wounds, observing throughout the closest antiseptic precautions. Having stopped all hæmorrhage, I passed my needle deep down and brought all cut and wound tissue in close apposition, four to six sutures being used. I also placed an antiseptic rubber drainage-tube in lower portion of the wound. Morphine hypodermatically was necessary to relieve the pain, and stimulants were also given on account of great exhaustion. His removal from the office to his boarding-house was accomplished by a large rocking-chair carried by four to six stout men. This sitting position he kept for two weeks, being unable to lie down on account of pain in the side. Morphine was still used. He suffered a great deal at night, the temperature being 101° F. (38.3° C.), but the fever subsided. No medicines were given, except Epsom salts to move the bowels. I dressed the wounds December 7th; found them doing well and thoroughly antiseptic. After this I dressed them at intervals of every two, three, or four days, always finding them in a satisfactory condition. The patient's general health was good and remained so throughout. On December 17th he was permitted to go to his home, a distance of eight or nine miles, where I visited him on December 20th, finding that the ride had been attended with little fatigue. At each visit I dressed the wounds, discharging him at my last visit, December 24th. Nothing occurred during his stay in town to affect his condition whatever, his hygienic surroundings being the best possible. The wounds healed nicely, with no suppuration. I never saw him professionally from the time he was dismissed until his last sickness, but met him on the street three times, when he complained of pain in the region of the wound, which I supposed to be due to pleuritic adhesions.'

"On August 4, 1894, I (McRae) was sent for to see him, but

was unable to go on account of illness. On August 6th I found him suffering great pain in the region of the wound, extending up the left side to the arm, with persistent hiccough and stercoraceous vomiting. To the right of the wound there was an enlargement about the size of a small hen's egg. Thinking possibly this enlargement contained pus, Fitts and Ellis, his attending physicians, and myself, inserted an hypodermatic needle, but found no pus. After a thorough examination and consultation, we decided that there was either a hernia or "telescoping" of the bowels. Pain was very great and morphine was necessary. As to treatment, previous to my visit (August 6th) Fitts had administered such as are usually suggested for a case of colic,—morphine being the chief remedy. The patient was in a very serious condition; pulse, 150; temperature, 101° F. (38.3° C.). On turning him over to make an examination, a most peculiar and violent hiccough set in, lasting for several minutes, during which time his agony was intense. The tympanitic tumor bulging out between the sixth and seventh ribs, the obstruction of the bowels, together with the history of the case, made the diagnosis of "diaphragmatic hernia" quite easy. We determined on an operation at once. This I performed early on the morning of August 7th, assisted by Fitts, Ellis, and Terrell, making a longitudinal incision beginning at the cartilage of the ninth rib and extending downward about five inches. The opening in the diaphragm was readily located, tightly grasping the gut, which I soon found was the ascending colon completely strangulated. I enlarged the opening in the diaphragm sufficiently to allow the introduction of two fingers, and, being unable to reduce the hernia, I enlarged it until I could insert my whole hand, and, after carefully breaking up the adhesions, which everywhere bound the peritoneum and the pleura together, finally succeeded in withdrawing from the thoracic cavity the entire stomach and greater omentum, about one foot of the small intestine, and the whole of the transverse and part of the descending colon. All these structures were gangrenous, dissipating every possibility of a favorable result. The wound was rapidly closed, and the patient put to bed in almost as good condition as when he was put on the table.

"During manipulation I grasped the apex of the heart with my fingers, and immediately improvement in the pulse was noted

by Ellis. This was repeated several times with same effect. The patient rallied after the operation and asked me what the result would be, but on learning the utter hopelessness of his condition refused to speak again, and died about seven or eight hours afterward. In this case strangulation had occurred five days prior to my seeing him. Had an early diagnosis been made, I feel sure that the strangulation could have been relieved and the patient's life prolonged. The opening in the diaphragm was accessible, and I believe it could have been closed with a fair chance of permanent recovery. The case serves to emphasize the necessity for early operation in all cases of acute obstruction of the bowels."

MEDIASTINAL TUMORS.

A colored woman 60 years old came under the senior editor's care with thoracic trouble in 1891. There was some difficulty of breathing, attended with acceleration of pulse and considerable swelling over the sterno-clavicular junction, with tenderness on pressure over the upper portion of the sternum and great sensitiveness upon percussion of the chest. According to the patient, there had existed for several months some glandular enlargements beneath the clavicle, with considerable enlargement of the upper anterior portion of the thorax. The diagnosis of mediastinal tumor originating in glandular complications led to a course of treatment calculated to bring about resolution. She took, internally, 10 drops of liquor arsenici et hydrargyri iodidi (Donovan's solution), with 1 drachm (4 grammes) of compound tincture of gentian, in a tablespoonful of water, three times a day, continuously. A combination of equal parts of the ointment of mercury, iodine, camphor, and belladonna was applied daily over the upper portion of the sternum and costal attachments, cotton being laid over the parts. The medication was kept up without intermission for three months, and there was evidence of such marked improvement that she was allowed to suspend all treatment for more than a month.

Upon seeing the patient again there were some indications of returning trouble, and a resumption of both the internal and external medication was directed. This course was continued for some months with almost complete relief of her troubles, and she ceased to use remedies of any kind for over a year. The patient

was active and able to walk considerable distances, but still complained of some difficulty of breathing. Her digestion and the state of her bowels were reported as comparatively good. But on the last occasion she was seen there was a state of great mental excitement, with religious frenzy, and her features were somewhat distorted. There was also swelling of her feet and ankles. A few days afterward she died suddenly, and a post-mortem examination was made in June, 1894. There was some enlargement of the thyroid gland, and caseous lymphatics in the axilla. Upon opening the thorax an extensive hydropericardium was found, which had no doubt been the cause of the dyspnœa through the entire period of suffering. The lungs were hyperæmic, the liver enlarged, and there were some small, glandular masses in the mediastinum, but no well-defined tumor existed. Adhesions had caused a complete matting of the lungs, stomach, pericardium, and diaphragm. After breaking them up and reaching the arch of the aorta, a pouch-like development was seen near the heart, of an aneurismal nature, accompanied by degeneration of the coats of the aorta and the carotid arteries, with fibrinous deposits within them.

The disappearance of all symptoms, which had at the outset indicated the presence of some abnormal growth within the thorax, had led to the conclusion that the alterative treatment induced the absorption or atrophic degeneration of the glandular structures of any neoplasm which may have existed. The result of the post-mortem examination tends to confirm that view.

At King's College Hospital a case of hydatid cyst of the anterior mediastinum perforating the thoracic wall occurred under the care of William Rose, $^{6}_{\text{Nov.25,'93}}$ in a domestic servant 25 years of age. Six years before, after recovery from bronchitis, she one day noticed a small lump, about the size of an acorn, just above her right breast. It steadily increased in size, but never gave her any pain or inconvenience. There had been no cough or respiratory embarrassment, and it was simply on account of the increasing size of the lump that she sought advice. On admission she presented a well-nourished, but somewhat anæmic, appearance. A uniformly smooth, hemispherical swelling, tense and elastic, was to be felt to the right of the median line and over the sternal ends of the second and third ribs. Commencing about a finger-breadth

from the clavicle, it extended to the lower border of the third rib below, touching the sternum internally, and measured three inches transversely and nearly the same vertically. No swelling could be detected in any other locality. On October 16th the patient was anæsthetized with the A. C. E. mixture. A transverse incision about three inches long was made over the most prominent part of the tumor, and the skin and fascia were carefully cut through; the fibres of the pectoralis major, which were thinned and expanded over the swelling, were separated, and the margins of the wound were kept aside by retractors. On attempting to isolate it from the underlying attachments the tumor gave way, and a quantity of clear, colorless fluid escaped, leading at once to the suspicion that an hydatid cyst had been opened. It was now found to extend between the second and third ribs deeply into the mediastinum, leading to a cavity large enough to hold about 10 ounces (310 cubic centimetres) of fluid; the sternum and contiguous ribs were slightly eroded. The fluid was evacuated, and the inner, gelatinous lining-membrane was easily removed by forceps without any hæmorrhage; the cavity was gently sponged with small sponges wrung out in a 1 in 40 carbolic lotion, and two long strips of cyanide gauze, impregnated with the iodoform and glycerin emulsion, were left in it, the superficial wound being dressed with gauze and wool in the ordinary way. This treatment was continued daily until the sixth day, when at 3 P.M. the patient, who was sneezing and leaning forward to speak to a friend, suddenly noticed that her dressing was soaked with bright-colored blood. Two minutes later it was removed, and a large quantity of blood just coagulating was found under it, soaking her garments, and there were clots in the bed. As the bleeding had then apparently ceased the deep plugs were not interfered with, but an extra strip was gently inserted and a fresh superficial dressing was applied. The patient was kept perfectly quiet and in the horizontal position. There had been no cough nor dyspnœa during this time, and the temperature, which during the whole week had never been above 99° F. (37.2° C.), was then 97° F. (36.1° C.); it rose to 99.3° F. (37.3° C.) the next morning and subsequently followed a normal course. A small drainage-tube was inserted instead of the stuffing, and the wound was redressed. Subsequently it was daily gently syringed out and there was no further hæmorrhage; the tube was

gradually shortened, and the cavity slowly contracted and healed without further complications. Microscopical examination of the cyst-wall revealed the presence of several daughter-cysts adherent to it, showing the characteristic scolices within them; the laminated appearance of the cyst-wall was also clearly seen.

This case seems worthy of being recorded alike on account of the rarity of hydatid disease in the anterior mediastinum, the absence of intra-thoracic pressure-symptoms, and the difficulty of diagnosis previous to either operation or exploration.

Kernig [21] Jan. 27, '94 reported a case of lymphosarcoma of the mediastinum to the Association of Physicians at St. Petersburg, December 20, 1893. It occurred in a housemaid, 27 years of age, who had an enlargement of the neck, with pain in her breast, and finally general malaise. The characteristic swelling of the lymphatic glands and of the veins, the weaker pulse on the left side, the pulse of 108 to 112, and yet no increase of temperature, all led to a diagnosis of mediastinal tumor. The general appearance of the patient, the cyanosis, œdema, acute sensitiveness of the skin, and the dullness and protuberance left no doubt as to the diagnosis. The limit to the dullness of the heart was not normal, being fully a finger-breadth over the border of the sternum on the right side, and over one and one-half finger-breadths over the mammillary line on the left side, where the apex was felt to beat in the fifth intercostal space. The aorta and pulmonary vessels gave weak tones at their respective valves, as though the tumor had encroached upon their walls. The liver was pushed below the border of the ribs, the diaphragm upward, and the lower lungs were collapsed. No ascites and no enlargement of the spleen were noticed. A greater enlargement of the axillary lymphatic glands of the right than the left side existed.

Schnitzler, of Vienna, [22] Mar. 14, '94 removed a chondroma from the chest-wall, reaching from the mammillary line on the left side to the sternum, five centimetres upward. It had existed for two and a half years. The tumor had extended into the pericardium, part of which, being removed, was replaced by a celluloid plate. The man from whom the chondroma was removed was advanced in years, but the aperture was closed by a long growth which effectually protects the heart without the use of the celluloid plate.

Pagenstecher, of Berlin, [22] Sept. 19, '94 says that about 11 per cent. of

all echinococci attack the lungs, and the mortality is 60 per cent. without operative treatment, the remainder recovering by perforation of the hydatids into the bronchi. Operative treatment shows a mortality of only 13 per cent. A boy, aged 9 years, having suffered for six months with his chest, underwent an exploratory puncture on the left side, in the ninth intercostal space, where fluid was found and discharged, giving permanent relief in three months. The tenth rib was resected to the extent of ten centimetres behind and just below the scapula. This operation revealed hydatids below the margin of the rib, and these were evacuated of over a pint ($\frac{1}{2}$ litre) of fluid. [24 Mar.4,'94]

EMPYEMA.

H. Dubief and A. Bolognesi [67 Aug.30,'94] report a case of empyema of a tuberculous character treated by injections of concentrated salt water, resulting in a complete cure. A young man was admitted to the Cochin Hospital, March 24, 1894, during the service of Dujardin-Beaumetz. The whole left side was immovable and devoid of vocal fremitus. Upon auscultation some râles were heard. The elevation of temperature, the pain in the side, the violent dyspnœa caused the supposition that there was a focus of broncho-pneumonia. On the 28th of March a painful point on a level with the clavicle, at the passage of the left phrenic nerve, and also a painful point at the ensiform cartilage were noticed. The base of the chest, behind and on the left side, presented dullness and a diminution of thoracic vibrations and of respiratory murmurs. On the following day 700 grammes (22$\frac{1}{2}$ ounces) of liquid were taken from the thoracic cavity. In five days the liquid had re-accumulated, and the heart had become displaced toward the right side. A new thoracentesis was then performed and 550 grammes (17$\frac{1}{2}$ ounces) removed by Potain's apparatus. No microbe was detected in the fluid removed at either time. On April 11th 1500 grammes (3 pints) of liquid were removed. On April 20th the operation of pleurotomy was performed, followed by irrigation with a solution of chloride of sodium, 20 grammes (5 drachms); sulphate of soda, 1 gramme (15$\frac{1}{2}$ grains); and distilled water, 1 litre (1 quart). The patient was free from fever after the pleural irrigations. His appetite improved and he began to increase in weight. At first the irriga-

tions were performed every day, every other day after a week, and every three days after three weeks. On the 8th of June the remains of the drainage-tubes were removed, having previously been cut off piece-meal.

Ten days afterward the wound had entirely healed, with no trace of a fistula. The respiratory murmur returned completely on the left side. There was no trace of tuberculosis at the apices of the lungs, though the condition had been previously shown to have been due to tuberculosis by the injection of the fluid into a guinea-pig with fatal results. The thorough chlorinization seemed to have destroyed the tubercles or bacilli of tuberculosis.

Mackenzie and Abbott, $\frac{6}{\text{Nov.3,'94}}$ reported, at a recent meeting of the Clinical Society of London, the case of a boy with subdiaphragmatic abscess communicating with the right pleura, successfully treated by costal resection. Three or four weeks after a sudden onset the disease culminated in an abscess which presented the appearance externally of a swelling in the epigastrium, becoming more prominent when the boy sat up or coughed, and giving distinct evidence of fluctuation. The sixth rib was resected just behind the midaxillary line and 30 ounces (930 cubic centimetres) of exceedingly-offensive, thin, watery pus, containing some flakes, were evacuated. The upper surface of the liver was felt through an opening in the forepart of the diaphragm. The whole cavity was well irrigated with a warm boric-acid solution, and a double drainage-tube was inserted. The cavity was irrigated daily, but the discharge continued to be offensive for several days. On the thirty-fifth day after the operation the wound was almost healed and there was no discharge. The patient was dismissed on the forty-seventh day. The lung expanded well, and the only sign to be detected six months later was a slight relative dullness at the base of the right side of the chest. The presence of air as well as fluid pointed to the perforation of the lung by gastric or duodenal ulceration.

Gaston reported to the American Medical Association, in June, 1893, that Jaccoud, of Paris, in selecting a point for the introduction of a trocar in the anterior portion of the thorax, considers that the region of Traube, on the lower part of the left side, of a semilunar shape, is the most favorable for puncture. It is the site which is least liable to complications with the diaphragm, pleura,

and abdominal wall, and there is less risk of encountering adhesions than in any other portion of the anterior region of the chest. He finds it above the fifth or sixth left costal cartilage, extending backward to the anterior extremity of the ninth or tenth rib. A trocar may be safely introduced on the posterior aspect of the chest, as low down as the eighth intercostal space, but if inserted on a lower line is likely to enter the abdominal cavity; and an incision has actually been thus made between the diaphragm and the liver, which had to be closed by suture, before making one above.

Carl Beck, of New York, [462 Feb.,'94] has performed resection of a rib in one hundred and forty cases of empyema. He does the operation in the anterior axillary line at the sixth rib, except in cases where a small cavity limits the line of incision. He has a special curved elevatorium on the longer edge of a pair of shears, for the purpose of severing the connection between the periosteum and the bone, exposing the rib and cutting so as to remove one inch. In this way the pleura is exposed, and the edges of the wound are protected from the contamination of pus by iodoform ether. A small opening in the pleura allows the gradual escape of pus. The whole cavity, being cleansed with bichloride-of-mercury solution, 1 to 5000, is searched by the finger for caseous masses, which may require the curette or spoon. Scarcely any hæmorrhage has resulted from this treatment, and the cures after the use of heart-stimulants—morphine, gymnastics, etc.—are very encouraging.

Two important features that have contributed no little to this result have been the use of iodoform-silk sutures to cause adhesion between the costal pleura and the outside skin, and also the delay in using a drainage-tube or spoon until all danger of hæmorrhage has ceased. The patient is lifted on his feet every three or four hours to favor the escape of fluid, while the wound is dressed with iodoform gauze and sterilized moss twice a day for the first few days.

John Ashhurst, Jr., of Philadelphia, [451 June,'94] read an important *résumé* of the latest improvements in the surgical treatment of empyema before the American Surgical Association, May 29, 1894. He indorses Estländer's operation in all cases requiring resection of ribs, except in children, who should be treated by simple aspiration. He does not think that hæmorrhage is usually formidable

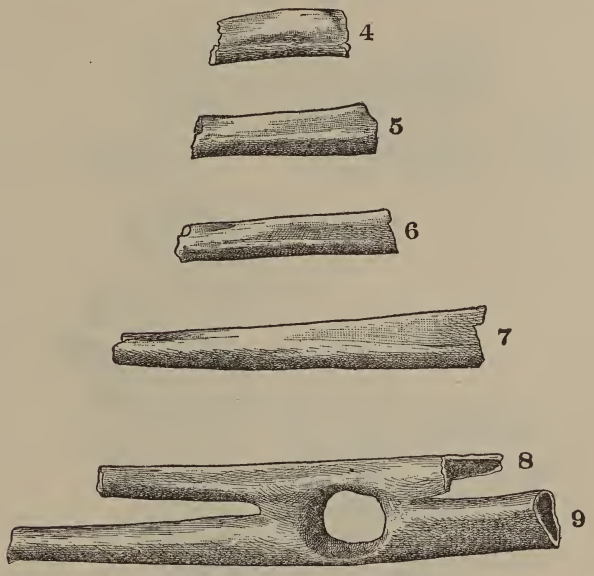
in an operation involving the intercostal arteries, as these have been closed by clotting in the progress of empyema. "The most extensive statistics of paracentesis," states Ashhurst, "are those of Evans,—526 cases with 153 deaths, giving a mortality of 29 per cent. Death, however, is not attributable to the operation in many cases, only 2 deaths of the 153 having been due to the surgical interference. That is the experience of operators generally. Even if the operation for empyema does not effect a cure, it does not make the patient worse. In the large majority of cases operations give great relief, and in a certain proportion, particularly in the young, they give a perfect cure. Very rarely do they cause death."

A remarkable feature of the spontaneous discharge of empyema, as brought out by Gaston in the discussion of Ashhurt's paper, is that it occurs most frequently in the anterior portion of the chest; and the cases which have come under his observation pointed near the attachment of the fifth costal cartilage on the right and left sides. It is inexplicable how and why a purulent collection in the pleura should point toward the anterior portion of the chest as high up as the fifth or sixth rib, when there is a space much lower down in the posterior portion of the chest into which the pus must naturally gravitate. There is nothing in the configuration of the thorax which should favor the tendency to so high an outlet; and it can only be accounted for by the fact that less resistance has to be overcome near the free spot of Marshall than in other parts of the chest.

A unique case, in a child aged 18 months, is reported by J. G. Willis, $^{2}_{\text{July 25,'94}}$ which presented a discharge of pus from the umbilicus. The child had suffered from bronchitis and pleurisy, and gave evidence of fluid in the left pleura. An exploratory aspiration between the fifth and sixth ribs on the left side disclosed the presence of pus, and it was inferred that this was the source of the purulent discharge from the umbilicus. The pus was supposed to pass out from the thorax by the deficiency of muscular fibres connecting the diaphragm with the sternum.

L. Monnier, of Paris, $^{24}_{\text{Mar.4,'94}}$ considers the subject of repeated resection of the ribs for pleural empyema, and reports a cure in a boy, aged 13, who had never had any serious sickness before 5 years of age, but was of delicate health. At this age he had scarlatina, which, being badly managed, was complicated with

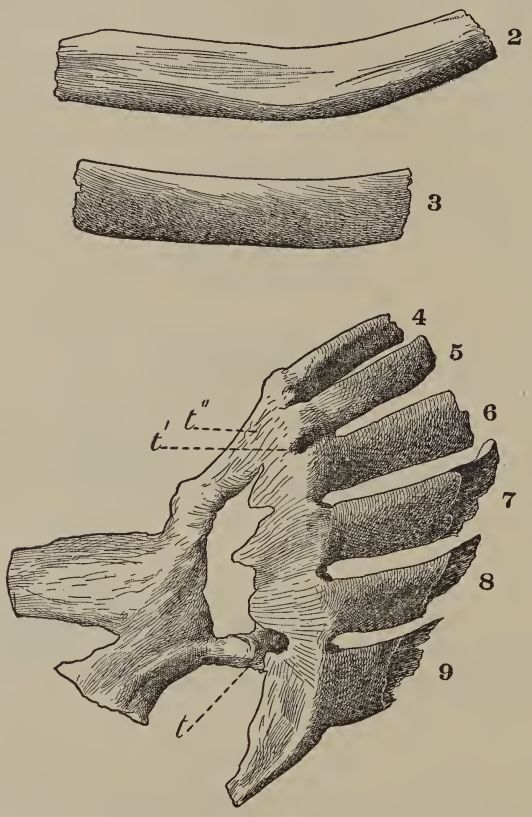
anasarca and effusion into the left pleural cavity, requiring evacuation of pus in the eighth intercostal space. This evacuation was done by a physician, in the axillary line, and a drainage-tube left for some time; then it was removed, a fistula remaining. At the age of 9 subperiosteal resection of the ninth, eighth, seventh, sixth, fifth, and fourth ribs was practiced, ten centimetres of the ninth and four centimetres of the fourth being removed, the portion of the other ribs resected leaving a trapezium. After irrigation of the pleura two large drainage-tubes were placed in the incision, which was sutured. The ninth and eighth ribs had met around



Pleural Empyema. (Monnier.)
Ribs removed by first resection.
Journal de Médecine.

the drainage-tube formerly inserted and had become adherent, leaving a full opening which could never have become obliterated, except by resection. The immediate results of this operation were satisfactory. There was little shock and scarcely any pain. By an energetic compression the external walls were approximated and there was very little hæmorrhage. On the eighteenth day the wound began to open and to suppurate. In November, 1891, another Liétevant-Estlander's operation was performed, and in March, 1893, fungous growths were curetted, final recovery following. (See illustrations on this and following page.)

Dandridge [96 Feb.,'94] concludes that a certain number of lung-cavities can be successfully dealt with by incision and drainage. Tuberculous cavities should always be opened if they occur in the lower portion of the lungs, but cavities at the apex should only be opened where free and persistent fetid expectoration is present and the rest of the lung is not involved. Hydatid cysts,



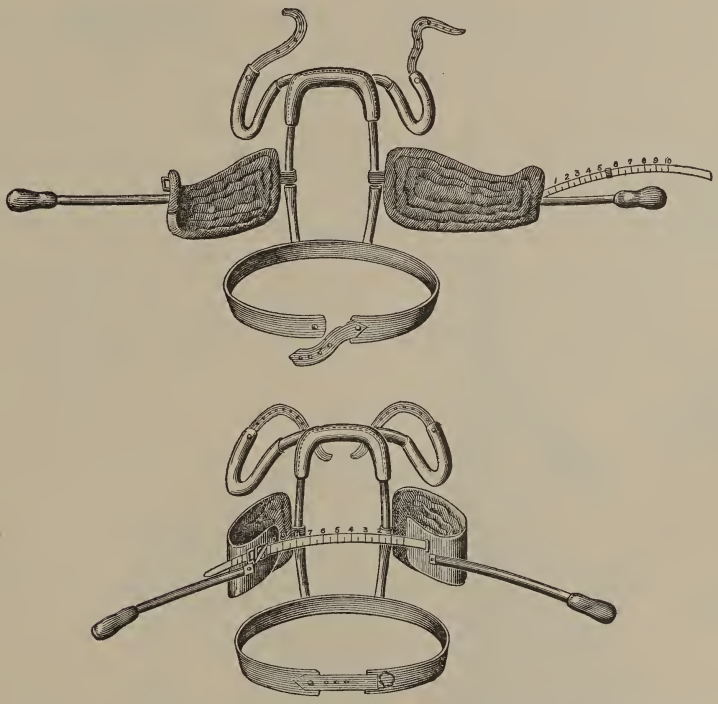
PLEURAL EMPYEMA. (MONNIER.)
Ribs removed by second resection. *t*, *t'*, *t''*, canals of intercostal arteries.
Journal de Médecine.

abscess, and gangrene, whenever they can be localized, should be freely laid open by the thermo-cautery and afterward packed with iodoform gauze.

NEW INSTRUMENTS.

J. Traub, of Mannheim, [34 Jan.23,'94] describes his apparatus for mechanical compression in the treatment of asthma and emphysema.

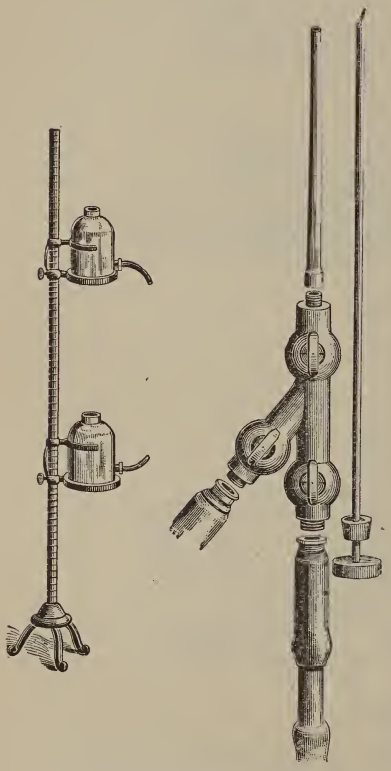
It consists of a single piece with two back pieces, shoulder support, and a belt for the waist, all made of inflexible material, with bands between. Two strong braces are shaped according to the thoracic wall, and to these are fastened a support for the back and clasps which allow them to be secured by the hand, so as to press more or less strongly about the chest with an equal pressure. The degree of pressure is regulated by a metallic shaft. Traub has treated emphysema successfully with this apparatus.



Apparatus for the Treatment of Asthma and Emphysema. (Traub.)
Münchener medicinische Wochenschrift.

The plan advocated by Heine Marks, of St. Louis, $\frac{82}{\text{May } 5,12,'94}$ for gunshot wounds of the chest is somewhat similar. Marks considers that the inflammation which always accompanies such injuries is best treated by rest, such rest being best attained by a plaster-of-Paris jacket. The pleura is thus allowed to absorb any serous exudation, the diaphragm relieves the pleura and lungs of much of the mechanical labor of respiration, and there is less friction. He suggests the propriety of first washing the surface

around the entrance and exit of the ball, irrigating the wound with an antiseptic solution, and applying dry dressing of iodoform or a combination of boric acid and phenol. He would then immediately apply the plaster of Paris, bandaging as far as the sixth ribs. He condemns unqualifiedly the use of the probe, and thinks that $\frac{1}{20}$-grain (0.003 gramme) doses of sulphate of strychnia hypodermatically are the best restoratives and prevent fatal results from shock. He presents twenty successful results.

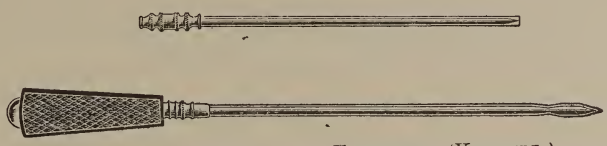


IRRIGATING ASPIRATOR. (LUIGI ZOJA.)
Deutsche med. Wochenschrift.

Luigi Zoja, $\frac{69}{\text{May } 24,'94}$ of Parma, Italy, presents a new instrument for thoracentesis, consisting of an upright, metallic, graduated column two metres high, having two glass receivers with faucets. These flasks will hold 1500 to 2000 cubic centimetres (3 to 4 pints), and have an opening in the top for connection with rubber tubes to a short glass tube. The connection with the trocar is made with rubber tubes containing short glass tubes. The handle of the trocar has three attachments by which to close or open the tube. The apparatus should be thoroughly sterilized with bichloride solution and sterilized water before the operation, and the trocar-needle should be kept in water. The flask should contain warm, sterilized water. The outlet of the flask is shut off by the handle, when the puncture is made with the usual antiseptic precautions. The trocar-needle being connected, that also is closed, and connection made with the flask. Upon opening, the stream passes from the flask into the other flask. The air then remains in the tubes until driven out by the sterilized water. If the attachment is closed and opened at another point, the current passes from the seat of puncture into the flask, or, if it

is desired to irrigate a cavity, one is shut and the other opened. This apparatus has been used with success for years in the University of Parma, and has given good results in several cases of peritonitis as well as in thoracentesis. It is a modification of Riva's irrigating aspirator.

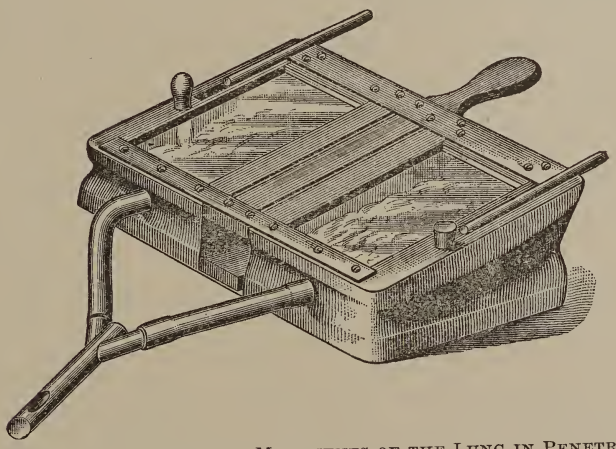
Alfred Kebbell, of Flaxton, England, $\frac{6}{\text{July } 14,'94}$ describes a new



Trocar and Cannula for Empyema. (Kebbell.)
London *Lancet.*

trocar and cannula for empyema, the use of which he advises when it may be necessary to enlarge the opening for the introduction of the drainage-tube. A groove runs down one side of the cannula, and a corresponding one on the trocar, so that the opening can be easily enlarged without the risk of the knife's slipping. He thinks that the principle might be adapted to the aspirator.

Andrew H. Smith, of New York, $\frac{451}{\text{Feb.},'94}$ describes a device for



Device for Illustrating the Movements of the Lung in Penetrating Wounds of the Chest. (Smith.)
International Medical Magazine.

illustrating the movements of the lung in penetrating wounds of the chest. This consists of two bellows, operated by a handle common to both, representing the thoracic cavities, and each containing an elastic bag representing the lung. The top of each

bellows is of glass. A slot on each side, covered with a slide, represents a wound of dimensions variable at pleasure. Tubes representing the bronchi and trachea connect the two bags. With the slot of one side wide open and the bag on that side disconnected from its fellow, it is seen that the movements of the bellows are without effect upon the bag; but when the connection is reestablished the bag receives air from its fellow when the handle is depressed and collapses when the handle is lifted, its movements being exactly the reverse of those of the bag on the other side. When the device representing the glottis is partly closed, this reverse movement is very marked. This action exactly resembles that seen in an animal when the thorax on one side is freely opened. On progressively lessening the size of the opening, the reverse action becomes constantly less until a point is reached at which the lung (bag) remains at rest in a state of partial inflation. With a still smaller opening the lung begins to follow the movements of the chest and becomes more and more independent of the action of its fellow. The practical application of this is seen in cases of empyema, where the patient may make the air pass from one lung to the other.

SURGERY OF THE ABDOMEN.

By WILLIAM T. BULL, M.D.,

AND

WILLIAM B. COLEY, M.D.,

NEW YORK.

LIVER.

Displacement.—C. L. Scudder [99 Jan.4,'94] operated upon a child, 24 hours old, with a congenital umbilical hernia containing the whole of the liver. The myxomatous tissue of the cord was adherent to the liver in several places, and there was some ascitic fluid. A slight incision in the ring allowed the liver to slip back into the abdominal cavity. It was not sutured. One year later the child was in good health and had no umbilical hernia. Richelot [5 Aug.,'94] examined a patient with a painful tumor in the right iliac fossa which was thought to be of appendical origin or possibly tubercular. On opening the abdomen it was found to be a displaced liver adherent to the abdominal wall. The adhesions were separated, and the organ replaced and fixed in position by catgut sutures passed through the capsule and parietal peritoneum. Three months later the liver was found in its normal position, and the patient was entirely relieved of his former symptoms,—pain and emaciation.

W. J. Kusmin [126 July 15,'94] reports a case of hernia, a little to the right of the median line, in a Russian domestic aged 28. The sac measured twenty centimetres in one diameter and twenty-five centimetres in the other. It contained a part of the right lobe of the liver, constricted at the neck, but not strangulated, which was readily reduced after an incision had been made in the neck of the sac. The liver was not sutured. Seven months later there was no pain nor recurrence.

Traumatism.—Zeidler [55 Sept.15,'94] reports three cases of stab wound of the liver, and draws the conclusion that there are no special symptoms which point to an injury of this organ, and that

hæmorrhage is readily controlled by properly-applied sutures and tampons. All his cases recovered in a few days. Lépine, of Lyons, [168 July,'94] discusses President Carnot's death and reports experiments made by him to determine the fatality and treatment of injury of the portal vein. As is well known, the knife penetrated Carnot's liver and opened the portal vein in two directions. The abdomen was opened and the hepatic wound tamponed, but the injury to the portal vein was not recognized until after death. From his experiments upon dogs Lépine concludes that a tear in the portal vein can with difficulty be reached and ligatured; that an injury of the right or left branch cannot be relieved; that ligature of the main trunk is not compatible with life. All of the dogs upon which this operation was performed died in less than two hours, the mesenteric veins being gorged with blood and the spleen enormously swollen. The chief symptoms of injury to the liver observed in man are: traumatic shock; signs of internal hæmorrhage, with collapse and syncope; local and radiating pain; nausea; hiccough and vomiting,—often bilious; and a feeling of suffocation. Icterus is not common. Death occurs usually from hæmorrhage or, later, from peritonitis, and in the cases which have recovered no one of the very large vessels has been opened. The indications for treatment are to seek the source of the hæmorrhage and control it, and to carefully examine all surfaces of the liver. Broca lost one case in which he had tamponed two wounds, the autopsy showing three others. In a second case he sutured a wound of the inferior surface, and at the autopsy found another of the superior surface.

Neoplasms.—Israel, of Berlin, [41 July 9,'94; 22 Aug. 1,'94] removed a sarcoma of the right lobe of the liver, the attachment being fifteen centimetres broad. Hæmorrhage was controlled during the operation by an elastic ligature wound around the whole right lobe and afterward by three compressing ligatures of stout silk and an iodoform tampon. The patient, a girl of 15, died, one hundred and ten days later, from metastases. The author states that, of 14 cases of extirpation of tumors of the liver, 2 had died,—1 of sepsis and 1 of secondary hæmorrhage.

Tricomi [2 June 16,'94] resected the left lobe of the liver, in a man aged 27 years, for tubular adenoma proceeding from the biliary canaliculi. At the first operation the ensiform cartilage was

removed and the oblique coronary and triangular ligaments severed. An elastic ligature was placed around the tumor and the hepatic peritoneum dissected up and sewed to the parietal peritoneum. Eighteen days later the tumor was removed, the hæmorrhage being checked by the thermo-cautery and perchloride of iron. The wound was completely healed on the sixty-sixth day.

Kusnezow and Penski [21, May 19,'94] have found, by experiments on animals, that extra-peritoneal treatment of the stump is infinitely less dangerous than the intra-peritoneal one, on account of the almost invariable hæmorrhage which follows the latter. Covering the surface with omentum seems to have no influence in preventing bleeding. From experiments on rabbits Meister [100, May 29,'94] has found that the regenerative power of the liver, after resection of a portion of it, is very great. The mortality increases as the part resected is greater. Of animals which lost one-fourth of their liver, none died; one-half, 14.4 per cent.; three-fourths, 25 per cent.; seven-eighths, 60 per cent.

Echinococcous Cysts.—A. A. Bobrow [336, Aug.18,'94] has collected 88 cases of echinococcus operated upon in Russia within the last five years, 49 of these being of the liver. In 21 cases Lindemann's operation was performed, with a death-rate of 20 per cent.; the remaining 28 cases were treated by Volkmann's method, with a mortality of 14 per cent. Bobrow reports also a successful case of his own in which he peeled out the sac and then filled the cavity with a 6-per-cent. sterile iodoform-glycerin emulsion and closed the liver wound. This procedure, which was suggested by Billroth, is of value chiefly in regulating pressure in the liver-cavity, preventing hæmorrhage and escape of bile.

Llobet [9, Oct.10,'93] reports eight cases of hydatids of the abdomen with one death, and urges the treatment by the immediate incision of Lindemann-Landau. His one death occurred in a case of relapse treated by puncture,—a procedure which he considers palliative at the best, and dangerous because of the possible poisoning from antiseptic injections. Other successful cases, treated by suturing the sac-wall or the liver to the parietes, are reported. W. J. Tyson, [2, Jan.20,'94] in a suppurating cyst of the convex surface of the liver, opened through the eighth intercostal space. R. Stewart [267, Sept.15,'93] reports a case in which the cyst had commu-

nicated with the gall-bladder and greatly dilated this organ, giving rise to symptoms like biliary colic. J. C. Verco [267 Sept.15,'93] describes a case in which one cyst ruptured into the peritoneal cavity and another suppurated into a bronchus, recovery, however, being perfect. J. B. Roberts [72 Jan.,'94] also reports a multiple cyst, and cases are described by Picqué [14 Mar.14,'94] and H. C. Gande [267 Sept.15,'93]; while six cases were presented to the Medical Society of Victoria, [285 Sept.15,'93] one complicated by cysts of the lung and one by a cyst of the spleen. Lutz [364 Oct.1,'93] reports a case successfully treated by drainage.

Jones [6 Apr.7,'94] reports a case of hydatid of the liver in a female aged 21 years. The tumor caused no pain; it was about four inches in diameter, its centre being in the right hypochondrium. Upon operation 120 ounces (3.7 litres) of fluid escaped. Recovery was uneventful. Pinkerton [2044 '93] reports a similar case in a male aged 28 years.

F. D. Bird [285 Dec.15,'93] reports a case in which he performed Lindemann's operation, and nearly four years later, owing to a recurrence, again opened the abdomen, evacuated the cyst, which was deep in the portal fissure, and sewed it up *in situ*. Recovery was prompt. He thinks this method will grow more and more in favor, as spontaneous cures and cures by puncture prove that it is not absolutely necessary to remove every bit of the cyst before hoping for union. J. Ross [2 Sept.22,'94] reports 11 cases operated upon by Volkmann's method,—viz., 3 cysts of the superior aspect of the liver, 4 of the inferior aspect, 1 intra-hepatic, 2 pulmonary, and 1 abdominal cyst. Of these one, a girl of 14, died twenty-two months after the operation, from a pelvic abscess supposed to have some connection with a fistule remaining from the former operation, though no direct connection was established. J. Thompson records [267 June 15,'94] a successful case in which he emptied and sewed up a large, single cyst adherent to the liver, kidney, and posterior abdominal wall, folding in the edges of the emptied sac, as far as possible, before suture.

J. Kohl, of Belleville, Ill. [364 Nov.15,'93]; Blanc, of Paris [228 Nov.15,'93]; and M. Hartwig, of Buffalo, [59 July 28,'94] report successful cases treated by puncture. Jumon, [108 Aug.15,'94] in a discussion of the various modes of treatment for echinococcous cysts of the liver, speaks in favor of tapping and the injection of a mild antiseptic, a process for which he claims as good results in simple cases as laparotomy can show,

and which avoids the long-delayed recovery and possible fistula which attends the patient operated on by Lindemann's method.

Abscess.—Zancarol, of Alexandria, [996 Apr.10,'94] has published his experience with over five hundred cases of hepatic abscess. He believes that a connection exists between abscess of the liver and dysentery, but his investigations by no means proved the constant presence of amœbæ, while streptococci and other organisms were frequently found. His operative technique is as follows: Puncture of abdominal parietes with one or more trocars, in order to locate the abscess; section of superficial tissues by means of the thermo-cautery; resection of a rib, if necessary; incision into abscess, also by means of the thermo-cautery; introduction of bent finger into cavity to hold the liver against the abdominal wall until retractors are in place, thereby avoiding the escape of pus into the peritoneal cavity; irrigation with warm salicylic-acid solution (1 to 1000), sponging dry and filling with iodoform gauze. If the abscess is in the left lobe, a bistoury is used instead of the thermo-cautery. Of 115 abscesses of the right lobe there were 54 recoveries and 57 deaths, among them being 32 multiple abscesses, which are said to be invariably fatal. There were 30 abscesses of the left lobe, with 13 deaths, 8 of them being from multiple abscesses. N. Macleod ridicules [235 Dec.,'93] the possibility of stitching the liver firmly to the abdominal wall, as it is moved up and down with each breath. He relies on a large oval metallic drainage-tube to protect the abdominal cavity from the escape of pus. Mandillon [188 Aug.19,'94] advocates the resection of part of the eighth or ninth rib for drainage of the cavity and antiseptic irrigation. Shunker, of Lal, [1055 May 16,'94] also advocates irrigation; while K. N. Das, of Calcutta, [1055 May 16,'94] expresses himself against any irrigation, and especially against irrigation with strong antiseptics. He quotes a striking recovery in support of his views. Margulier [336 Aug.18,'94] reports 33 cases of abscess of the liver, treated in the Hebrew Hospital in Odessa from 1888 to 1893; most of the cases followed dysentery; 22 were operated on, with 12 recoveries (55 per cent.) and 10 deaths. If there were adhesions, the abscess was opened at once; otherwise, if possible, the second part of the operation was delayed four or five days, the liver being then stitched to the abdominal wall and the abscess opened, a rib being resected, if necessary. The cavity was drained and filled with iodoform gauze.

Successful cases are reported by J. W. Shemwell, of Bumpas Mills, Pa. 86 Mar.,'94; G. F. Lydston, of Chicago 115 Dec.,'93; A. Pataje, of Lima 542 July 31,'94; E. Atgier 243 Nov.,'93; Villar 188 Apr.29,'94 (in whose case the cavity was so large that lumbar drainage was also resorted to); W. Molesworth, of Port Blair 239 Apr.1,'94; and Grimm, of Berlin. 41 No.45,'93 C. A. Morton, of Bristol, 6 May 12,'94 reports 3 fatal cases of abscess of liver,—1 associated with dysentery and 2 with echinococcus.

GALL-BLADDER.

Mayo Robson 2 Apr.28,'94 read a comprehensive paper, before the International Medical Congress in Rome, upon the surgery of the gall-bladder, illustrated by seventy-eight cases operated on by himself. Experience has taught him that the danger from hæmorrhage in jaundice is not so great as has been supposed, but that it is very grave if jaundice and malignant disease co-exist. He considers it unjustifiable to submit a jaundiced patient, with malignant tumor of pancreas, liver, or bile-ducts, to this great risk in the hope of gaining the slight relief afforded by biliary fistula. Chloride of calcium, administered for a few days before the operation, lessens the danger from hæmorrhage. Cholecystotomy is the operation to be tried; and, if accomplished, the gall-bladder should be sutured to the aponeurosis rather than to the skin, and by all means drained and not closed by suture. If the ducts cannot be closed there is left: 1. Cholelithotrity, or crushing the stone *in situ* between thumb and finger or by padded forceps,—to be preferred to an incision of the duct or an intestinal anastomosis. 2. Choledochotomy, or incision of the duct, with subsequent suture,—often a difficult procedure, and best carried out by a small right-angled cleft-palate needle. A drainage-tube should always be inserted into the right-kidney pouch. 3. Chol ecystenterostomy. The anastomosis is easy if the bladder be distended, but difficult if contracted. By means of the author's bone bobbin the operation can be rapidly performed, as only two sutures are required. 4. The daily injection of solvents, after an interval of some days, through the cholecystotomy opening. Hot water, taurocholate of soda, ether, ether and turpentine, olive-oil, and a 5-per-cent. solution of sapo animalis or oleic acid are all of use. 5. Cholecystectomy, as a secondary operation in occlusion of the cystic duct. In cholecystotomy, when it is impossible to

bring the bladder up to the abdominal wall, a drainage-tube is just as efficient protection of the general peritoneal cavity as a tube made of the omentum. The list of 78 cases contains only 4 deaths. In 3 of these cases there was cancer of the pancreas, 2 of the deaths occurring almost immediately from exhaustion and the third in nine days from hæmorrhage. The fourth fatal case was a choledochotomy, where a large stone was removed by incision of the duct, and death followed fæcal extravasation through an unobserved tear in the colon. Fifty-eight of the cases were cholecystotomies, with the three deaths already referred to. A fistula persisted a long time in only 3 cases, and in 2 of these cholecystectomy was successfully performed. As to the effect of anastomosis between the gall-bladder and colon, it is interesting to note that in 1 of the 3 cases jaundice persisted; the others were described as perfectly well; one some months and the other nearly four years after the operations.

Murphy $\frac{59}{\text{Jan. 13, '94}}$ favors cholecystenterostomy in all cases where an opening already exists in the gall-bladder or requires to be made in it, excepting only those cases where the gall-bladder is too small for the insertion of his button or where adhesions, etc., render an intestinal anastomosis impossible without kinking or too great tension. The mortality in the seventeen cases in which his button has been used for cholecystenterostomy is given as *nil;* and without his button in the twenty-three cases reported up to December, 1893, the mortality was 35 per cent. Some very pertinent questions in this connection are asked $\frac{99}{\text{Apr. 5, '94}}$ by an editorial writer regarding the after-history of these successful cases of anastomosis. Is the liver constantly menaced by microbic infection from the intestine? Does intestinal indigestion follow the altered relations of the intestinal juices?

Perkins $\frac{99}{\text{Jan. 25, '94}}$ reports five very interesting cases of cholecystotomy very closely simulating the symptoms of appendicitis. He adds that a fistula does not close because the mucous membrane is sewed to the skin, but that it does close when united to the cut edges of the peritoneum and transversalis fascia.

J. W. Elliot, of Boston, $\frac{99}{\text{July 26, '94}}$ reports a case where he performed cholecystostomy, giving vent to 3 pints (1½ litres) of bile and 20 gall-stones. Four months later, as the attacks of pain recurred and bile continued to pour from the fistula, the abdomen

was again opened and a stone as large as a pigeon's egg taken from the common duct, near the duodenum. The incision in the duct was closed with silk and well packed with gauze. In a week the biliary character of the discharge had disappeared and the stools were once more yellow. Terrier [14 Mar.7,'94] reports a similar case. Before opening the abdomen the second time he introduced a probe as far as possible into the biliary fistula (18 centimetres) without feeling a stone. When the abdomen was opened it was seen that the probe, instead of entering the common duct, had passed into the hepatic duct. The stone lay so completely behind the adherent duodenum that it was necessary to open the gut, insert the finger, and press the stone down in order to come upon the common duct. Both incisions were closed and a drain left in position. A biliary fistula appeared, but it healed spontaneously.

M. F. Porter, of Fort Wayne, [72 May,'94] reports three successful cases of cholecystotomy for calculi. H. Kehr, of Halberstadt, [336 July 28,'94] has performed forty-nine cystotomies, all of the uncomplicated cases (forty-five) recovering, and without permanent fistulæ. Favorable cases are also reported by Monod, [14 July 29,'94] Routier, [14 July 22,'94] and Erasmus. [13 Sept.15,'94] Tuffier [14 July 29,'94] records a case of distended gall-bladder in which he performed cholecystenterostomy successfully; but three weeks later the autopsy showed extensive carcinoma of the liver, a portion of which, having occluded the duct, had caused the cystic distension.

W. Martig [336 Apr.14,'94] gives an exhaustive review of all reported cases of operations upon the gall-tracts. He believes cystostomy will be less practiced as the newer operations are better understood. In uncomplicated cases of cholelithiasis vesicalis, he advocates sewing up the bladder and dropping it back, and claims that only one case has been recorded where collection of bile was sufficient to break through the suture in the bladder, where the common duct was pervious at the operation. If the duct be not pervious, this operation is absolutely contra-indicated. Cystostomy in occlusion of the cystic duct is less dangerous than cystectomy; this operation is further indicated in the presence of many small stones, of a single large stone which cannot be removed, or of firm adhesions. Martig sees, in cystostomy in two stages, only added difficulties and no advantages, and recommends it only in case

the bladder-wall is too thin to hold a suture. Cholecystectomy is absolutely indicated in carcinoma or ulceration of the bladder-wall, and is preferred to drainage in uncomplicated empyema or dropsy with obliteration of the cystic duct. When the common duct is occluded or many small stones are present this operation is contra-indicated. Out of 87 cases of extirpation recorded there were 12 direct and 3 indirect deaths (17 per cent.).

Lane $\frac{6}{\text{Aug.18,'94}}$ contributes a rare case of a gall-stone producing acute intestinal obstruction. At operation a large stone was found at the lower end of the jejunum. It was removed and the patient recovered.

STOMACH.

Gastroplication.—H. Bircher, of Aarau, $\frac{214}{\text{Sept.15,'94}}$ reports six cases in which he operated for dilated stomach. In five of these gastroplication was performed to reduce the size of the stomach; in the other case to cover the raw surface made by the separation of adhesions. This case died of collapse in fifty-six hours. One of the others died in thirty days, apparently of cerebral anæmia, brought on by overexertion when first allowed to get out of bed. The other cases showed marked improvement. Bircher considers his operation indicated: 1. To reduce the size of the stomach in cases of general or local dilatation. 2. To cover in raw surfaces left by the separation of adhesions. 3. To fold into the cavity of the stomach such portions of its wall as are likely to ulcerate and perforate. Joseph Brandt, of Klausenburg, $\frac{336}{\text{Apr.21,'94}}$ also reports a case in which he had performed gastroplication.

Gastric Ulcer.—H. W. Page $\frac{6}{\text{Mar.24,'94}}$ reports two cases of gastric ulcer with perforation, in which he performed laparotomy and gastrorrhaphy with fatal result. The perforation in the first case was in the anterior wall, and the suturing was easily carried out and, as the autopsy showed, successfully so; but at the time of the operation, forty-five hours after the onset of acute symptoms, peritonitis was already well advanced. The other case was operated on in less than twenty-four hours after its onset, but the position of the perforation, three inches from the cardiac orifice in the lesser curvature, together with the extreme brittleness of the thickened stomach-wall, presented insurmountable difficulties. In another such case Page purposes making use of a rubber tube and suturing the stomach over it,—Witzel's gastrostomy, in other words.

T. H. Morse, of Norwich, Eng., $^{2}_{\text{Mar.17,'94}}$ reports a case of perforated gastric ulcer successfully treated by suture. He had the good fortune to operate in less than five hours after the attack. The stomach was perforated anteriorly, close to the cardiac end. There was a large amount of stomach-contents in the abdominal cavity. Both the stomach and abdominal cavity were washed out with hot water. W. H. Bennett $^{6}_{\text{July 7,'94}}$ and H. Gilford $^{6}_{\text{June 2,'94}}$ each report a successful case. Maclaren, of Carlisle, $^{2}_{\text{Mar.17,'94}}$ reports one successful and two fatal cases operated on by himself. In all three the operation was performed within twelve hours of the onset. In one case death was due apparently to a collection of stomach-contents which was overlooked in washing out the peritoneum. W. F. Haslam, of Birmingham, $^{2}_{\text{Nov.11,'93}}$ also reports a fatal case.

E. Deansley, of Wolverhampton, Eng., $^{32}_{\text{Feb.,'94}}$ reports two fatal cases of perforating gastric ulcer which were too far gone for operation when brought to the surgeon. A third case, where the general condition was thought too weak to admit of laparotomy, under medical treatment made a gradual but perfect recovery. Nevertheless, the writer inclines to operative treatment, especially if the case is seen early, as he thinks the mortality from medical treatment is at least 95 per cent.

Carle, of Turin, $^{59}_{\text{May 19,'94}}$ advocates gastro-enterostomy rather than resection for gastric ulcers with stenosis complicated with hæmorrhage. Küster, of Marburg, $^{90}_{\text{Sept.,'94}}$ opened the stomach for recurrent and excessive hæmorrhage, cauterized the ulcer, and performed gastro-enterostomy with gratifying success. B. F. Curtis, of New York, $^{96}_{\text{Aug.,'94}}$ relieved a patient of hæmorrhage and symptoms due to pyloric stenosis, by a Heineke-Mikulicz operation, the incision passing clear through a two-inch ulcer.

Resection.—From a careful study of all statistics Th. Kocher, of Berne, $^{214}_{\text{Oct.15,Nov.1,'93}}$ points out that the mortality of pylorectomy is not very much higher than that of gastro-enterostomy, and that the possibility of radical cure will lead surgeons more and more to the adoption of resection where the condition of the patient permits a choice. He confirms the statistics of Wölfler, that resection for carcinoma, where no adhesions exist, has a mortality of only 35 per cent., whereas the percentage with slight adhesions is 64, and with bad adhesions 91; and he sees in this fact the reason for the high mortality of resection for simple stricture of the pylorus,

which Salzmann gives as 57 per cent. As one-half of the deaths in resection occur from leakage in the gastro-duodenal suture-line, he has given up the Wölfler method, now in common use, and closes the stomach completely, establishing an opening between the duodenum and the stomach posteriorly. He is able to record six cases in which he has performed this pylorectomy with gastro-duodenostomy with perfect success. To obtain such a result the

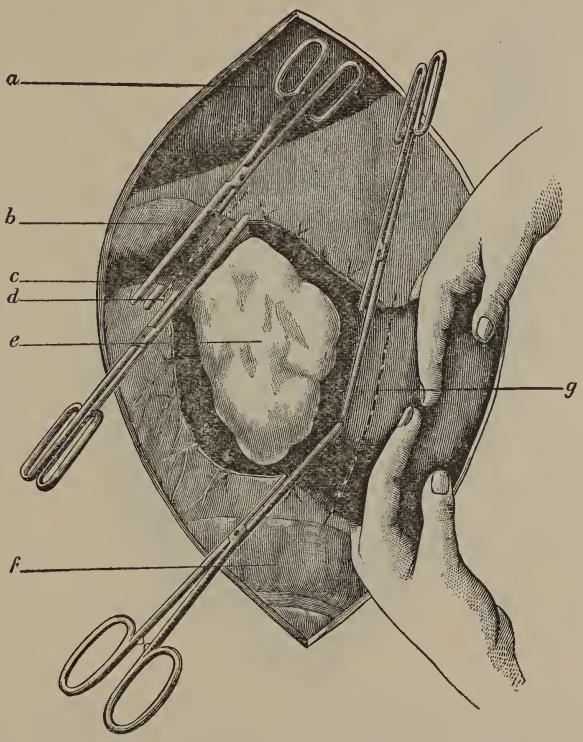


FIG. 1.—RESECTION OF THE STOMACH. (KOCHER.)

a, liver; *b*, duodenum; *c*, pylorus; *d*, line of incision in the duodenum; *e*, carcinoma; *f*, transverse colon, *g*, line of incision in the stomach.

Correspondenz-blatt für Schweizer Aerzte.

author states that three rules must be observed: 1. Perfect asepsis, no disinfectants being used in the abdominal cavity except at points soiled by stomach-contents. 2. To avoid leakage, the continuous suture of fine braided silk (Rydygier, Lauenstein) is an essential, and one line of suture should pass through the whole thickness of the stomach and intestinal wall. 3. The use of clamps insures the complete removal of the tumor, simplifies the

operation, and produces an exact line of incision. In all, he has performed this operation nine times, with two deaths. He describes his method of operating as follows: A median incision (ten to fifteen centimetres), beginning a little above the umbilicus and extending downward, is made, the navel excised, and hæmorrhage arrested. The pylorus is now lifted out as far as possible, the omentum separated from it above and below, four clamps put in

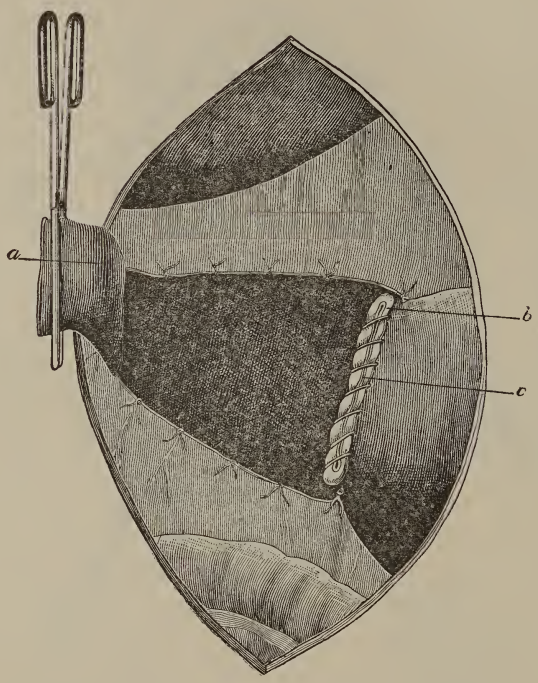


FIG. 2.—RESECTION OF THE STOMACH. (KOCHER.)

a, duodenum turned out over the abdominal wall; *b*, first continuous suture through all coats of the stomach; *c*, mucous membrane.

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position as seen in Fig. 1, and the peritoneal cavity perfectly protected by gauze.

The duodenum is cut between the clamps, the gut which protrudes from the jaws of the distal clamp thoroughly disinfected, the other cut surface wrapped in gauze. An assistant now clamps the stomach with his fingers, the stomach is cut across, the tumor removed, and the free end of the stomach closed by a continuous silk suture, which includes all the layers of the wall. The suture-

line is washed with bichloride and turned in by a continuous Lembert suture.

The compresses are changed and the assistant takes the stomach in both hands and brings its posterior wall forward and to the right, thus occluding the lumen of the duodenum by pressure against the abdominal wall. With the forceps still in position, the posterior wall of the duodenum is attached to the posterior wall of the stomach, and continuous peritoneal sutures

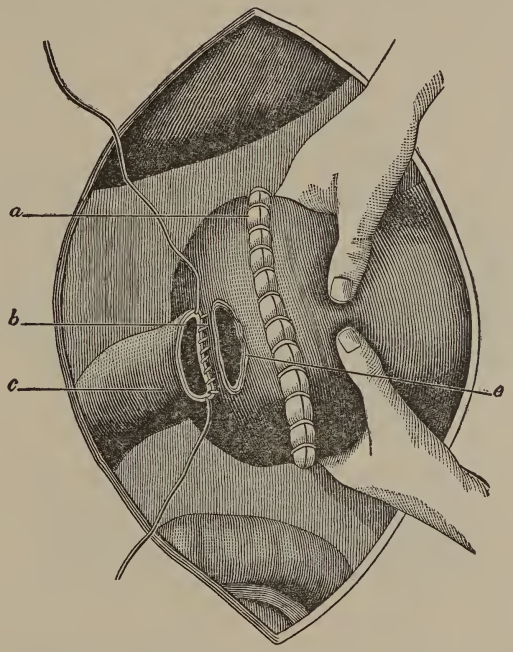

FIG. 3.—RESECTION OF THE STOMACH. (KOCHER.)

a, continuous peritoneal suture of stomach; *b*, posterior peritoneal suture; *c*, duodenum; *e*, incision in posterior wall of stomach.

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are applied from the upper to the lower margin. The duodenal forceps are removed, the duodenum carefully cleansed, and bleeding-points secured. A suitable incision is made in the stomach and a continuous suture applied through all the coats of stomach and intestine. The peritoneal suture which was first applied posteriorly is now continued in front, the parts are replaced and the abdomen closed.

The discussion of Kocher's method of pylorectomy came up at the Swiss Medical Congress, Zurich, when O. Kappeler $\frac{214}{\text{Aug. 15, '94}}$

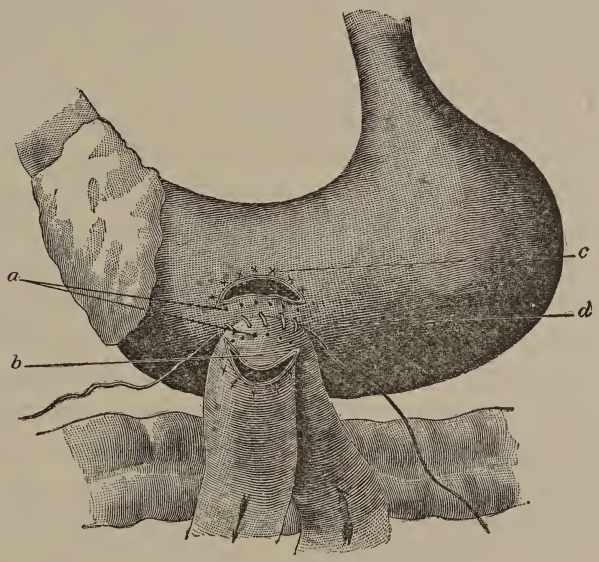
presented his series of four successive recoveries by the Billroth-Wölfler method. He attributes Kocher's good results to his operative ability rather than to his method. He has performed pylorectomy fourteen times with five deaths, and only one of these was due to leakage in the difficult suture-line, which Kocher avoids by his new procedure. Kappeler thinks that to sew the duodenum to the posterior wall of the stomach would often cause too great tension, and he sees in an early operation the hope of better statistics. He advocates thorough washing out of the stomach before and after operation if necessary, and thinks by this means to have saved the life of one patient with dilated stomach when vomiting set in one day after operation. If vomiting do not set in before the second day he gives his patients anything they wish to eat, not excluding beefsteak and sauerkraut. If they vomit, he washes out the stomach and begins to feed again.

Quénu [22 July 25,'94] records a case of resection of the pylorus for epithelioma, with gastro-jejunostomy. The patient gained 18 pounds (8 kilogrammes) in eighteen days, and sixty days after the operation was reported in a flourishing state of health.

Levy [2 Sept.1,'94] proposes to resect the cardiac end of the stomach through a rectangular incision, from ensiform to umbilicus, and from this point through the whole width of the rectus muscle. He believes that both vagi can be divided below the diaphragm without danger. The cardiac end of the stomach is first isolated and, as the neoplasm is removed, œsophagus and stomach sutured after each stroke of the knife, otherwise the œsophagus will retract beyond reach. The sutures are passed obliquely through the coats of the œsophagus.

Gastro-enterostomy.—According to Kocher, [214 Oct.15,'93] the best gastro-enterostomy consists in suturing the jejunum transversely to the stomach in such a way that the proximal gut lies posteriorly and the distal anteriorly. This arrangement favors the evacuation of the contents of the stomach and prevents the return of bile from the duodenum. The incision in the intestine is transverse, extending through more than half its circumference, and not straight, but semilunar,—convex downward. In this way a sort of valve is made and in sewing to the stomach the sutures are passed not through the edge of the valve, but through its base, so that it may stand out free in the lumen of the canal. (See cut.)

Albert, of Vienna, [2] Jan. 27, '94 describes a new method of jejunostomy which he has recently practiced where the carcinoma of the pylorus was too great to allow its removal and the conditions were unfavorable for gastro-enterostomy. A loop of jejunum was drawn out through a transverse incision in the right rectus muscle and an anastomosis established at its base between the proximal and distal portions to allow the bile and pancreatic juice to flow through. A second cutaneous incision was made one and one-half inches above the first and the intestinal loop drawn through



GASTRO-ENTEROSTOMY. (KOCHER.)

a, position of the posterior continuous suture, which includes all layers of the wall; *b*, jejunal valve; *c*, position of the anterior continuous suture, which includes all layers of the wall; *d*, posterior peritoneal suture; *e*, thread left long to complete the peritoneal suture.

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and fastened as in Frank's gastrostomy, the lower incision being completely closed. The gut was opened by cautery on the fourth day. Death from extension of the carcinoma occurred in eight weeks. In a second case where there was extreme prostration following extensive gastric ulcers produced by caustic, the patient died from collapse in a few hours. Montaz [31] June 6, '94 reports a similar case when the last weeks of a patient suffering from cancer of the entire stomach were much relieved by a jejunostomy.

E. Hahn, of Friedrichshain, [69] July 5, '94 has performed jejunostomy five times in cases where starvation was threatened and pylorus

resection, gastrostomy, and gastro-enterostomy were impossible. One case, in which the whole stomach-lining had been destroyed by acid and vomited out, made a rapid recovery after the jejunostomy, and was fed by the fistula for a month, until the strictures of the œsophagus were sufficiently dilated to allow the passage of food. The fistula was then allowed to close spontaneously.

Tumors.—Zeller, [133 Sept.25,Oct.2,'93] quoting Czerny's dictum that "a cancer of the stomach, recognizable as such, is no longer operable," offers the opinion that all cases of stenosis of the pylorus, accompanied by dilatation and unrelieved by lavage, should be submitted to surgical exploration. A number of cases of carcinomata might be found at a period early enough to warrant excision, while non-malignant stenoses would be also better attacked than at a later time, when the patient, exhausted by protracted disorders of digestion, has less recuperative power. Kraske [4 May 22,'94] calls attention to the same points, and expresses the hope that, as technique improves and physicians encourage patients suffering with possible stenoses of the pylorus to early interference, results achieved by operation, both cures and prolongations of life will increase in number. Kraske condemns strongly the suggestion of Rockwitz that any convenient coil of small intestine may be used in gastro-enterostomy, and cites a case of his own in which, after such practice, the patient died of inanition, and autopsy showed the anastomosis to be situated only thirty centimetres above the ileo-cæcal valve. Referring to the importance of uniting the bowel and stomach so that peristalsis occurs in the same direction in both, Kraske states that he deems all efforts at valve-construction to be superfluous, and that the original Wölfler operation suffices in a great majority of cases.

Chaput [14 June 3,'94] reports a case of pedunculated adenoma of the posterior wall of the stomach, occurring in a patient 64 years of age, and giving rise to the symptoms of cancer. The mass was successfully removed through an incision in the anterior wall of the stomach.

J. H. Clayton, of Birmingham, [2 Mar.24,'94] reports the case of a boy of 16 years, who was caught between two freight-cars, suffering from shock and vomiting blood, but showing no external injury. Twelve hours after the accident the abdomen was opened and a

slight laceration in the spleen was sutured. No other injury could be found. The autopsy showed two ruptures of the mucous membrane of the stomach,—one of the anterior wall about its middle and the other opposite to it in the posterior wall, the mucous membrane alone being stripped from the muscular layers. Ziegler $_{\text{Apr.21,'94}}^{336}$ reports a similar accident, in a man of 23 years, accompanied with injury to the left lung and kidney. The hæmoptysis and hæmaturia subsided in three weeks, when a fluctuating, pulsating tumor was discovered under the left costal margin. Four weeks later laparotomy was performed, and three litres (quarts) of non-coagulable, bloody fluid were drawn from a cyst between the coats of the stomach. The recovery was uneventful.

PERITONITIS.

Barbacci $_{\text{June 15,'94}}^{814}$ discusses the bacteria commonly found in the exudates of purulent peritonitis, especially the bacterium coli commune and Fraenkel's diplococcus, and states that neither is constantly present; that the bacillus coli is incapable of exciting inflammation in a sound peritoneum, and only does so when accompanied by some irritating agent. The co-operating causes of perforative peritonitis are the intestinal gas, the fæces, and the bacteria which escape synchronously from the bowel into the peritoneum and there produce peritonitis; while the toxins formed by the micro-organisms growing in this congenial medium are absorbed and poison the patient. Silberschniedt $_{\text{Sept.10,'94}}^{4}$ groups the agents which, by irritating the peritoneum, make the growth of bacteria possible as (1) substances which destroy the endothelium; (2) solid, non-absorbable bodies. Either group alone is incapable of exciting a fatal peritonitis, but in combination with bacteria produce characteristic effects.

In the Lettsomian lectures, F. Treves, of London, $_{\text{Feb.3,'94}}^{2}$ calls attention to the fact that inflammation in the peritoneum, as elsewhere, is a protective and not a destructive process, and that death from peritonitis is a toxæmia. The peritoneum is not everywhere equally sensitive or susceptible, as illustrated by the different course and results of inflammatory processes about the gall-bladder or pelvis and those affecting the covering of the small intestine. This sensitiveness is much diminished by recurring attacks of inflammation. The following classification is pro-

posed: 1. Peritonitis due to infection from within, including cases of intestinal obstruction, perforation, appendix troubles, cancerous growths of gut, gall-tract inflammations, etc. 2. Peritonitis due to infection from without, including puerperal and other pelvic cases, and some operative peritonitis. 3. Peritonitis due to the pneumococcus. 4. Peritonitis due to Koch's bacillus. 5. Peritonitis of doubtful nature, including cases due to (*a*) irritants, (*b*) rheumatism and other diseases, and (*c*) cases in the newborn. In the first class of cases the bacterium most constantly found is the bacterium coli commune. Treves believes this to be the most important germ, although streptococci occur not infrequently, and staphylococci are occasionally met with; the latter play their chief rôle in the second class of cases, while in puerperal peritonitis and fatal cases after operation the streptococci are usually found.

H. Nimier $^{243}_{\text{Nov.,'93}}$ presents seven cases of peritonitis, six of them fatal, following injury of the small intestine by the kick of a horse. The author regards it as important that a patient receiving such an injury, though the external signs be small and the shock slight, should be at once taken to a hospital, where an hourly record can be made of his condition. At the first sure signs that a general infection is setting in, the abdomen should be opened, the intestines carefully examined and repaired, if ruptured, and the cavity flushed with great quantities of boiled water.

Singh $^{239}_{\text{Apr.16,'94}}$ and Hadra $^{1}_{\text{June 2,'94}}$ report cases of suppurative peritonitis successfully treated by incision, irrigation, and drainage. Cases of localized suppurative peritonitis successfully treated by thorough lavage are reported by Dendy $^{6}_{\text{Aug.25,'94}}$; C. A. Morton, of Bristol $^{2}_{\text{Feb.3,'94}}$; McCarthy (three cases) $^{6}_{\text{Apr.7,'94}}$; C. F. Marks, of Brisbane $^{267}_{\text{Dec.15,'93}}$; P. Bancroft, of Brisbane $^{267}_{\text{Dec.15,'93}}$; E. S. Jackson, of Brisbane $^{267}_{\text{Apr.15,'94}}$; and W. A. Quinn, of Kentucky. $^{224}_{\text{Sept.23,'93}}$

E. Nicaise $^{91}_{\text{Aug.,'94}}$ and Wiggin $^{59}_{\text{Aug.11,'94}}$ present reports of cases of chronic peritonitis with painful adhesions, successfully operated upon. The latter author believes that the use of peroxide of hydrogen, followed by plenty of normal salt solution, is most beneficial in preventing adhesions. The cavity is left full of hot salt solution. Many otherwise successful laparotomies are followed by such extensive and painful adhesions that the patients are left in a worse state than before operation, and the observance of this simple rule would avoid such an unfortunate result.

O. Guelliot [577 Aug.,'94] finds that an early exploratory laparotomy and flushing of the cavity give hope for success in peritonitis caused by bacilli and streptococci. Whether this treatment will save patients in whom gonococci have set up a general peritonitis is a question for the future to determine. J. M. H. Brown, of Chicago, [192 Apr.,'94] is an advocate of flushing by means of a trocar and cannula and a lumbar drain. The abdomen is punctured, either above the transverse colon or just above the symphysis, according to the source of infection, and 10 gallons (40 litres) of filtered and sterile hot water may be used at intervals for days, or continuous irrigation may be employed. The tube of exit must be larger than the tube of entrance.

Tuberculous Peritonitis.—Treves [96 May,'94] considers the treatment of tuberculous peritonitis at some length, adopting Aldibert's classification into the ascitic form, the fibrous form, and the ulcerous form. These groups present tolerably-sharp clinical distinctions, and the courses they run vary greatly, as do the results of treatment. The several varieties of each form in turn modify the prognosis and treatment. Only the ulcerous form is incapable of spontaneous recovery. Of 308 cases of all forms treated by operation, 140 were of the ascitic type, and of these 101 were cured, 3 died, 2 were improved, 6 not improved; of 26 cases of the fibrous type, 21 were cured and 5 died; of 22 cases of the ulcerous type, 13 recovered and 9 died; of 41 cases of tuberculous peritonitis secondary to tuberculosis of the pelvic organs, 27 were cured and 14 died. The number of deaths includes those due to operation and those due to the disease. The mortality of operation is put down as 2½ per cent.; 33.4 per cent. of the "cured" cases are stated to have been complete recoveries.

In regard to the indications for operation in the ascitic type, the very acute cases, or those forming part of acute general miliary tuberculosis, are not to be operated upon. The other varieties, whether the dropsy is encysted or not, are amenable to laparotomy. Irrigation, medication of the peritoneum, and drainage have shown no better results than simple incision; further, sinuses have sometimes followed the use of drainage. Relapse occasionally occurs.

The fibrous form least often calls for interference, as it is the form which recovers spontaneously or by medical measures. If, however, the general condition of the patient is deteriorating,

operation may be required. Incision and irrigation have given the best results. The ulcerous form, where there is little or no fluid or the fluid is encysted in many small loculi, is almost beyond the reach of operation; where, however, the fluid is not confined to one or to several large pockets, incision and drainage are of benefit.

After reviewing the opinions held by various authors concerning the mechanism of the cure of tuberculous peritonitis effected by operation, Treves offers no new solution of the question, but simply states that incision is necessary, and that puncture, even often repeated, produces little or no effect. Nannatti and Baciocchi [50 May 1,'94] state that recovery, as a consequence of laparotomy, is the effect of phagocytic removal of the bacilli, vessel-formation, and production of new connective tissue; further, that these changes are inflammatory, and are due to the laparotomy and not to the irrigation. Kischinewski [41 Mar.15,'94] shows cure to be due to the irritation of the peritoneum by the incision and the air and not to the influence of air, light, irrigation, or medication upon the vitality of the bacilli. He introduced into the abdomens of two guinea-pigs some finely-divided material suspended in emulsion. After an interval of five days he opened the abdomen of one of them, and after a few days killed them both. In the animal not submitted to laparotomy, the particles injected were superficially encapsulated upon the peritoneum by giant, epitheloid, and wandering cells, as well as new connective-tissue cells. In the animal whose abdomen had been opened the particles were more deeply situated and surrounded by *new connective tissue*, whose cells were undergoing karyokinesis, and by larger numbers of inflammatory cells. Hache [577 Sept.,'94] concludes, from the examination of tubercles present three months after laparotomy and irrigation, done for (ascitic?) tubercular peritonitis, that the tubercles had undergone fibrous changes, but that there had been recent development of new tuberculous tissue in their peripheries.

The following authors publish papers on tubercular peritonitis: M. D. Kischenski [100 June 26,'94]; Nannotti and Baciocchi [211 Oct.8,'93]; H. Marsh, of London [2 Sept.30,'93]; Nitot [24 Dec.24,'93]; F. Legueu [3 Feb.10,'94]; Carl Beck, of New York [1 Apr.21,'94]; O. S. Runnels [19 Aug.25,94]; Gattie and Castle [126 July 15,'94]; A. de Marsi [472 Mar.,'94]; Ch. Roersch [236 Feb.,'94]; J. S. Kolbassenko [126 Jan.15,'94]; and A. Demmler. [100 Apr.14,94]

Recoveries following simple incision are reported by D'Arcy Power [6 Dec.23,'93] and Gardner. [282 Feb.,'94] F. H. Markoe [96 Jan.,'94] irrigated with boro-salicylic solution; Picqué [14 Oct.15,'93] with naphthol-camphor, and closed the wound. McNutt [77 Feb.,'94] (four cases), H. N. Rucker, of California, [77 Apr.,'94] and C. K. Briddon, of New York, [96 Jan.,'94] evacuated the fluid and drained the wound with success. Audiat [14 Dec.20,'93] evacuated fluid by a trocar and injected air. Senn [101 May,'94] injected 2 drachms (8 grammes) of a 10-per-cent. iodoform emulsion of glycerin after evacuation.

Deaths following laparotomy for tubercular peritonitis are recorded by Barling [2 Jan.20,'94] (two cases) and Pascher. [192 Dec.,'93] Montaz performed [31 May 16,'94] laparotomy three times in one case, with only temporary relief. By his advice the family physician then tapped the ascitic abdomen, when death rapidly followed.

INTESTINES.

Intestinal Obstruction.—Fifty-eight cases of intestinal obstruction have been reported during the past year, exclusive of occlusions occurring in strangulated herniæ. Of this number, 30 occurred in children under 12 years of age and 28 in adults. In the former group are 3 instances of congenital absence of the anus, which require no special remark (Hamilton [187 July,'94]); the others are all intussusceptions. In the latter group are included acute and subacute obstructions, whether preceded by symptoms of chronic obstruction or not.

A number of cases, so loosely described as to be valueless, are excluded; and in many of the included cases the condition found at operation is so vaguely and incompletely recorded as to greatly diminish the importance of the cases in framing conclusions. Were the condition of the strangulated bowel and peritoneum stated and the exact mode of treatment and after-treatment described, the reported cases would be far more instructive. Of the 28 cases in adults operated upon, 21 were cured and 6 died; in 1 the result is not stated.

There are 13 instances of obstruction by *adhesions*, which varied from dense inflammatory masses to more or less delicate bands; 10 of the patients were males and 3 females, the average age being 35 years. In several of the cases previous inflammatory diseases of the abdomen are mentioned, not infrequently

appendicitis, and in 1 case, that of Dorfler, $^{34}_{\text{Dec.26,'93}}$ the band was associated with an old, long-reduced hernia.

The average time of operation after the development of symptoms was $5\frac{1}{13}$ days, but gangrene of the bowel was found in Dorfler's case $^{34}_{\text{Dec.26,'93}}$ twenty-seven hours after the first attack of pain, in which case an artificial anus was first formed, and three days later resection of the bowel was successfully performed.

All of these cases recovered from the operation, and, except the above case and one other, the procedure adopted was liberation of the gut by division or dissection of the adhesions. In one case of dry tubercular peritonitis, reported by Cave $^{2}_{\text{July14,'94}}$ the obstruction was relieved, but the patient died one month later, of apoplexy. The greatest period elapsing between the initiation of symptoms and operation was twelve days. In this case, Cordier $^{102}_{\text{Jan.,'94}}$ states that perforation had occurred, but that the patient was saved by suture of the opening and lateral anastomosis above and below this point by Murphy's button.

Next in point of numbers are *kinking* and *strictures*, the latter of which include one case of malignant disease. Four cases of stricture of the bowel, resulting finally in acute obstruction, were operated upon three times successfully. There were two males and two females, the average age being $41\frac{1}{2}$ years. All of this group, save one, showed symptoms of more or less obstruction for some time prior to the acute attack which determined interference, ten days being the average duration of acute symptoms prior to operation,—ten the shortest, eleven days the longest. The usual procedure was the formation of an artifical anus with secondary plastic operations or resection of the strictured portion of the gut.

The only fatal case reported by Hamilton $^{187}_{\text{July,'94}}$ is almost unique. The patient died, as was found at autopsy, of obstruction at the site of the neck of an old spontaneously-cured ileo-cæcal intussusception. The ascending colon and ileum at their point of union had gradually contracted, and finally one of the tags, a relic of the previously-sloughed intussusception, had blocked the lumen of the stricture and produced a complete obstruction. In none of the cases was gangrene found or peritonitis noted.

Kinking occasioned obstruction in 3 cases,—2 males and 1 female,—the average age being $20\frac{1}{3}$ years. The average time of

interference was the seventh day, and the usual procedure was the formation of an artificial anus or lateral anastomosis between coils above and below the kink. The angulation of the bowel was always due to inflammatory fixation of the affected part.

Obstruction by impacted gall-stones occurred twice. Both cases were females, and their average age 61 years. Both had suffered from repeated attacks of biliary colic. In the first case operation was performed on the fourth day, in the other on the seventh. In the former, reported by Gusenthal, $^{9}_{\text{Apr.28,'94}}$ the stone was found in the transverse duodenum; and in the latter, by Körte, $^{69}_{\text{Feb.28,'94}}$ ten inches above the ileo-cæcal valve. In neither case was any damage to the intestinal wall at the point of impaction noted. In each the stone was removed by incision and the wound closed by Lembert sutures. Both cases recovered, though one of them died, ten weeks later, of obstruction of the jejunum by bands (Gusenthal $^{9}_{\text{Apr.28,'94}}$).

Intussusception furnishes two cases, both in males, whose ages averaged 48 years (Cave $^{2}_{\text{July 14,'94}}$). Both patients perished, —operated on the third and fourth days in desperate condition. In one, death occurred during operation, while attempts were being made to reduce a very œdematous enteric invagination; in the other, immediately after the formation of an artificial anus, the patient died in what is reported as diabetic coma, the intussusception not having been reduced.

Volvulus occurred in three cases, in one of which, although a typical case of volvulus of the sigmoid, the result is not stated. In another case, reported by Elliot, $^{99}_{\text{June 14,'94}}$ volvulus occurred in the ileum, at the origin of Meckel's diverticulum; the latter was adherent at the umbilicus and was strangulated by the rotation at its origin. Perforation occurred, exciting a peritonitis from which the patient died. In one case *Meckel's diverticulum*, by knotting itself about a knuckle of small intestine, produced a fatal strangulation. In another case fatal obstruction resulted from impaction of fæces in the ascending colon. These cases serve to emphasize the importance of early diagnosis and interference by operation in intestinal obstruction. Patients suffering with strangulated hernia are, happily, but rarely subjected to the dangers of delay. How much more promptly, then, should patients, possibly suffering from internal strangulation, and certainly exposed to the risk of

peritonitis, at least be offered the succor afforded by operation! Physicians into whose hands cases of this class naturally come at first should realize that an abdominal section, *per se*, is attended with but slight danger contrasted with the risk of procrastination. Expectant treatment in the presence of intestinal obstruction invariably breeds disaster. Every hour of postponement means increased exhaustion of the patient and the development of conditions likely to handicap the surgeon, if not to render his efforts futile. Conservatism, so called, should to-day, at least in the field of intestinal obstruction, be supplanted by more accurate and earlier diagnosis and treatment by surgical means.

Körte [5 June,'94] removed from the small intestine, about ten inches above the ileo-cæcal valve, a gall-stone the size of a hen's egg, which had produced symptoms of total obstruction. Boyle [243 Feb.,'94] relieved an intestinal obstruction, caused by Meckel's diverticulum, nine days after the onset of symptoms. Death followed almost immediately. The diverticulum was situated twenty-five inches above the cæcum, was bent on itself so as to form an arch with the concavity upward, and was firmly attached by its extremity to the urachus and umbilical arteries, which were not patent, but were abnormally large, as was the umbilical vein. It was under the arch thus formed that the small intestine was caught and strangulated. The author considers this case a strong proof of the theory that the diverticulum is a remnant of the omphalo-mesenteric duct.

Carl Bayer reports [88 Nos.34,35,'94] three cases of intestinal obstruction in children caused by the slipping of the small intestine in behind the abnormally-movable cæcum, cæcal stenosis from old local peritonitis, and a band. The last two cases were successfully treated.

Intussusception.—During the last year 27 cases of intussusception in children have been reported with sufficiency of detail to render them of value. The reporters are Thomas Nelson, [32 Dec.,'93] A. E. J. Barker, [6 Feb.24,'94] W. O. Roberts, [224 July 14,'94] Ainsley, [6 May 19,'94] Beatley and E. W. Ridley. [2 Apr.28,'94] Nineteen of the 27 cases were instances of ileo-cæcal invagination; 5 were enteric, 2 ileo-colic, and 1 colic; 19 were males and 8 females. The average age was a trifle over 2 years, but, excluding 6 cases over 2 years of age, the average is $8\frac{1}{3}$ months. Of the whole number, 15 recovered and 12 died. Twenty-three were subjected to non-operative treat-

ment, and of these 7 were cured, 1 died, and 15 came to operation. Nineteen were submitted to operation, including the 15 failures above alluded to and 4 cases in which operation was primary. Of the 19 cases operated upon, 8 recovered and 11 died. Of the 7 cases cured by non-operative measures, 5 were treated upon the first day, 1 on the second, and 1 not stated. Of the unsuccessful cases, 7 were treated on the first day, 2 on the second, 3 on the third, 1 on the fourth, 1 on the fifth, and 1 not stated. The majority of successes was gained by the injection, per anum, of air and water, with inversion of the patient or manipulation of the intussusception. Anæsthesia was often employed, but the retching attendant on recovery from the anæsthetic is occasionally noted as a cause of recurrence where reduction had apparently been accomplished.

The position of the tumor in these cases was various; the intussusception even protruding at the anus and yet being reduced. Operation in every case was laparotomy followed by reduction, formation of artificial anus, or resection of gut.

Of the 8 cases successfully operated upon, 3 were so treated on the first day, 2 on the second, 2 on the fifth, and 1 on the thirteenth (?); of these, 1 was a primary operation. Of the 11 deaths after operation, 1 case was operated upon on the first day, 2 on the second, 3 on the third, 3 on the fourth, 1 on the fifth, and 1 on the seventh; of these, 3 were primary operations. Death was alleged to be due to shock in 8 cases, peritonitis in 2, and congestion of the lungs in 1. Reduction was impossible, owing to œdema as early as the third day, in 2 cases; to adhesions on the second day, and to gangrene on the fourth day.

Analysis of these cases shows the importance of early treatment. Within the first forty-eight hours enemata of water, at moderate pressure, should be used, with manipulation or inversion. If this fail, an anæsthetic may be given and the process repeated; but if failure then occur, the abdomen should be opened without delay and such subsequent steps carried out as the condition of the intussusception thus disclosed indicates. After forty-eight hours, in the majority of cases operation should be the primary procedure.

Tumors.—A case of intestinal obstruction due to a carcinoma of the ileum five inches above the ileo-cæcal valve is reported by

Ricketts, $^{96}_{\text{Apr.,'94}}$ who found that after excision of the tumor the distal portion of the gut was so slightly movable that anastomosis by Maunsell's method was impracticable. He therefore united the divided bowel by Murphy's button. Death occurred fourteen hours later, and at autopsy the coaptation was found to be perfect.

F. H. Markoe, of New York, $^{96}_{\text{Feb.,'94}}$ reports two cases of malignant disease, one of the stomach and one of the sigmoid flexure, in each of which life was prolonged, and the horrors of death from cancer practically averted by anastomosis of the alimentary canal above and below the tumor.

Sutton $^{1077}_{\text{Aug.15,'94}}$ calls attention to the fact that, while all carcinomata of the colon have their origin in the crypts of Lieberkühn, they occur in two forms. In one the bowel is constricted by a narrow band, while in the other the growth is of some size and blocks the lumen of the gut by infiltrating the mucous membrane, the muscular and subserous coats. The first variety naturally is more amenable to treatment, and occurs at a later period of life than the fungous form. In discussing the histories of cases of cancer of the colon, the author explains the relief of symptoms of complete obstruction, which occur from time to time, by stating that sloughing of the tumor may go on to such an extent as to secure protracted patency of the gut. As a rare cause of death after perforation of the ascending or descending colon, gangrenous emphysema or phlegmon of the abdominal walls is mentioned, and Adam and Jaques $^{31}_{\text{Jan.27,'94}}$ report a case illustrating this complication, the factor in which was probably the bacillus coli.

In treatment Sutton strongly advocates a small incision in the linea alba, and, having ascertained the site of the obstruction, the formation of an artificial anus at the point most suitable. After the symptoms of acute obstruction have subsided, various radical operations for the permanent relief of the obstruction may be undertaken.

Edmunds $^{2}_{\text{Oct.21,'93}}$ reports a case of cancer of the cæcum, operated upon by excision four years previously, as cured, but with a fæcal fistula. He also mentions a case of cancer of the sigmoid flexure, in which, after excision of the tumor, lateral anastomosis had been done with success. At the end of fifteen months no recurrence was recognizable. Stimson $^{96}_{\text{Dec.,'93}}$ reports a case exactly similar, without recurrence at the end of fifteen months. Lane $^{6}_{\text{Apr.21,'94}}$ re-

ports a case of sarcoma of the mesosigmoid, treated by excision of the affected mesentery with the corresponding part of the sigmoid flexure. Anastomosis was performed by Murphy's button and the patient recovered.

Buschke, [13 May 15,'94] in discussing a subserous lipoma of the left hypochondriac region, calls attention to the different forms of tumors grouped under the head of properitoneal lipoma. He would exclude from this group small, irreducible, omental hernias presenting in the linea alba and lipomata associated with hernial sacs, whether the lipoma precedes or follows the appearance of the hernia. Subserous lipomata are most prone to develop at those points where the subserous fat normally exists in considerable amount or where vessels pierce the abdominal wall; hence their occurrence in the linea alba and at the internal rings.

Coley [96 Sept.,'94] reports two cases of inoperable sarcoma of the abdominal wall completely cured by the erysipelas toxins. The diagnosis was confirmed by exploratory laparotomy in one case and by microscopical examination in both. The number of cases cured by erysipelas toxins, and without recurrence after many months, is encouraging, but the numerous failures recorded will confine this method to inoperable cases.

Robinson [568 Jan.,'94] discusses the effect of pressure exerted by abdominal tumors upon the intestines, and points out that obstruction of such origin occurs in the large intestine in 75 per cent. of the cases. The rectum is most often affected owing to its comparatively fixed position and to the frequency of tumors of considerable size developing from the pelvic viscera; further, such tumors may compress and occlude other portions of the intestine present in the pelvis and especially if fixed there by adhesions. Tumors of the pancreas, kidney, suprarenals, etc., are referred to as capable of giving rise to obstruction of the duodenum in its fixed parts.

Cysts.—Schwartzenburger [336 July 28,'94] and Krautz [2 Sept.8,'94] report cases of cysts of the omentum, of lymphatic origin, successfully operated upon by ablation of the affected part.

Guermonprez [220 Nov.3,'93, et seq.] offers a valuable contribution to the literature of cysts of the mesentery. He reviews the various lesions capable of giving rise to cysts in the mesentery, and traces the historical development of opinion leading to the present classi-

fication. He discusses the relative merits of enucleation and of drainage, and concludes that extirpation should be practiced only in those cases in which the cyst is of small size and without close relation to any of the vital structures present in the retroperitoneal tissues. Drainage, or marsupialization, he would use in cysts of large size or where the connections of the cyst are such as to render enucleation an extraordinarily hazardous procedure. Coggans [202 Jan.25,'94] and Guermonprez [220 Nov.3,'93] report cases of mesenteric cyst successfully treated by drainage.

Anastomosis.—J. B. Murphy, of Chicago, [59 June 9,'94] describes the technique of the insertion of his mechanical device for anastomosis.

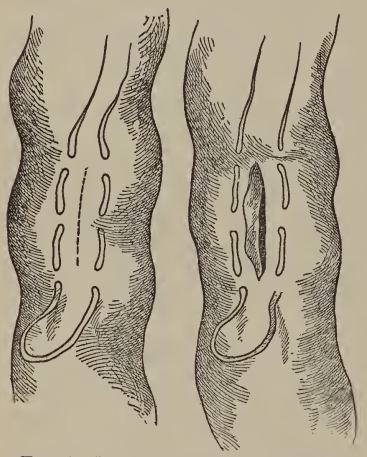


FIG. 1.—INTESTINAL ANASTOMOSIS. (MURPHY.)

Showing running thread before and after incision in bowel.

Medical Record.

For cholecystenterostomy a "puckering-string" is passed about the line of incision in the gall-bladder and duodenum; the incision being made, one-half of the button is placed in each viscus, the strings drawn up and fastened, and the halves of the button brought together.

Care should be taken to include all the free edges of the incisions between the buttons. The compressed tissue sloughs, comes away with the button, and an opening as large as the button remains.

In lateral intestinal anastomosis the process is the same. In pylorectomy, after removal of the tumor, the stomach is completely closed, and the anastomosis between the duodenum and stomach is made two inches posterior to the suture-line. In the duodenum the puckering-string is inserted as shown in Fig. 3, as is also done in end-to-end intestinal anastomosis. The thread is given a double turn in the mesentery (*A*, Fig. 3) to insure against leakage by escape of the mesentery from the grasp of the button.

A number of interesting cases in which Murphy's button has been successfully applied are reported. W. T. Dodge, of Big Rapids, Mich., [9 June 23,'94] made three unsuccessful attempts to close a

fæcal fistula in the ileum and sigmoid following a gunshot wound. The friability of the tissues prevented success, and ten weeks after the injury a portion of the small intestine was excised and end-to-end approximation accomplished by means of the button, with perfect result. One month later the sigmoid was treated in the same way, also with complete success. In each case the buttons came away in a week,—in the first instance from the

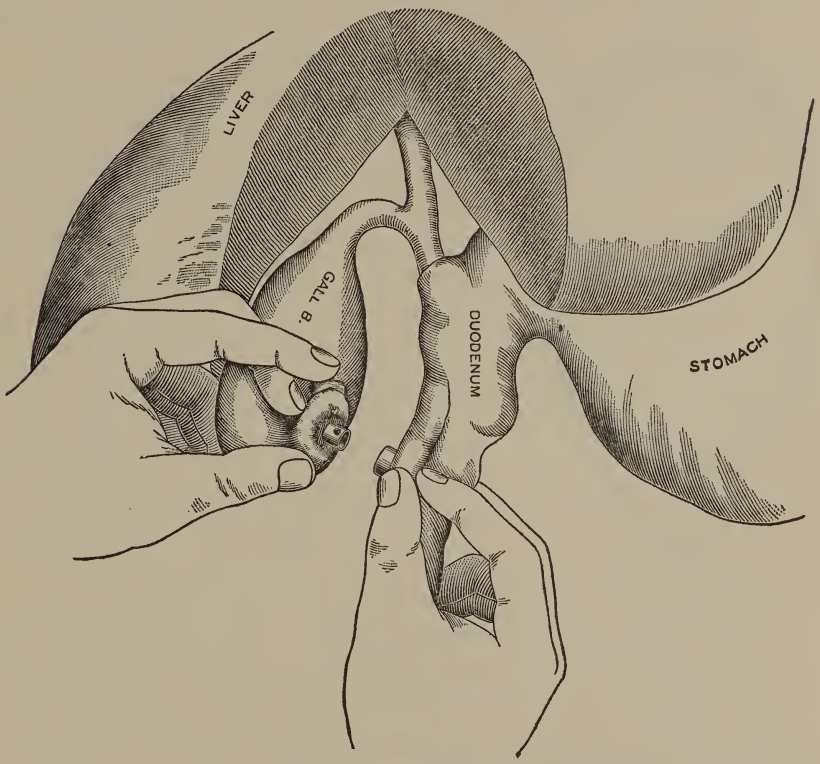


FIG. 2.—INTESTINAL ANASTOMOSIS. (MURPHY.)
Button as held when pressed together, performing cholecystenterostomy.
Medical Record.

artificial opening in the sigmoid, in the second per anum. At the second operation the site of the previous anastomosis was located by means of a small band of adhesion, and the calibre found to be in no way decreased. F. S. Dennis, of New York, [1] performed end-to-end anastomosis in a fæcal fistula following strangulated hernia of a loop of the ileum. The button was passed on the twenty-second day, and a small fæcal fistula closed on the

[1] Aug. 25, '94

twenty-fifth day. W. B. Rogers, of Memphis, [59 Jan.27,'94] reports a similar case, in which ten inches of small intestine were excised. He also performed a cholecystenterostomy upon a patient who had a biliary fistula and stones in the common duct. On the seventh day the button came away through the fistula, and much of the food escaped in the same manner, while the escape of bile from the fistula was almost entirely relieved. In three months the patient succumbed to an attack of diarrhœa.

FIG. 3.—INTESTINAL ANASTOMOSIS. (MURPHY.)

Manner of inserting running thread in end of bowel. *A*, double turn through mesentery of the thread; *B*, *C*, peritoneum.

Medical Record.

H. H. Grant, of Louisville, [224 Oct.21,'93] proposes the use of a clamp for lateral anastomosis. After the mesentery has been tied off and the gut resected, he inserts his clamp, one jaw into the lumen of each bowel-end, and brings the two together. The clamp is so constructed that pressure begins at some distance from the lock. With the bowel thus firmly held, eight minutes is sufficient for a double suture, and the clamps are then pressed hard together, cutting out an elliptical piece of each gut, four inches by one-half inch. The free ends of the bowel are then sutured. This elliptical opening is said to show no tendency to contract.

W. Horrocks [2 Feb.3,'94] removed, from a woman aged 38 years, thirty-nine inches of small intestine, with the accompanying mesentery and glands, containing a large round-celled sarcoma. The cut ends were brought together and the lower gut invaginated into the upper by means of a bone tube, as recommended by Paul. Owing to the great dilatation of the upper gut, it would have been difficult to have brought it into the lower gut. Two months later the patient was in excellent condition.

J. Israel, of Berlin, [69 Feb.22,'94] performed left colotomy for fæcal

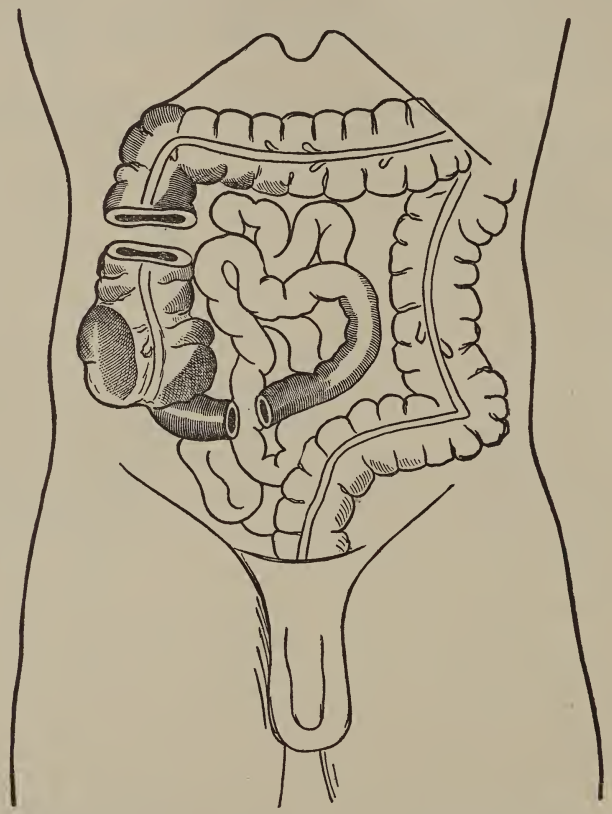
obstruction in a woman of 85. The large intestine presented in the wound and was opened, a great mass of fæces and much gas escaping. By digital examination, thirteen months later, it was discovered that a carcinomatous stricture was seated apparently above the opening in the bowel. A successful resection was performed, and at the operation it appeared that it was not the sigmoid flexure which had been opened, but the ascending limb of an abnormally-long transverse colon, which hung in V-form across the abdomen.

New Operative Procedures.—Roux $^{336}_{\text{Sept.15,'94}}$ offers a plan successfully practiced by him for the prevention of recurrence in cases of volvulus. In two cases he has been obliged to do laparotomy for recurrence of volvulus previously reduced by the same operation. He sutured the entire sigmoid mesocolon against the abdominal wall, and by this procedure prevented any farther rotation.

Allingham $^{6}_{\text{June 23,'94}}$ successfully relieved a fibrous stricture of the sigmoid flexure by a procedure which he terms enteroplasty, and which is only the application of Mikulicz's operation upon the pylorus to strictures of the intestinal canal lower down. He makes a longitudinal incision through the stricture, opposite the mesentery, and then sutures the wound, previously spread so that the suture-line lies at right angles to the axis of the gut. The cases reported were successful.

V. Baracz $^{336}_{\text{July 7,'94}}$ discusses at length the experiments made by Salzer upon dogs, to determine the possibility of excluding parts of the intestinal canal from the alimentary tract without removing them from the abdominal cavity, and quotes Salzer as deprecating total exclusion of any part of the bowel without providing for the drainage of the secretions of its mucous membrane by establishing a fistula. Among the dogs operated upon, however, were two in which the ileo-cæcal coil was excluded, and the animals survived many months without apparent injury; and at autopsy neither ulceration nor distension of the excluded coil was found. Hochenegg, Frank, and Eiselsberg had already practiced exclusion of portions of the bowel, but with fistula-formation, when a case of chronic ileo-cæcal intussusception, irreducible through adhesions and inflammatory thickening, was operated upon by Baracz. Removal of the affected coil was impossible; so the ascending colon and ileum were divided and united by lateral anastomosis,

using plates of Swedish turnip. The excluded coil was closed by suturing the divided efferent ascending colon and the afferent ileum, and the abdomen closed. Recovery was uneventful and ten months after the operation the patient was perfectly well. There was no evidence of contraction of the anastomotic opening, and no tumor could be demonstrated in the iliac fossa.

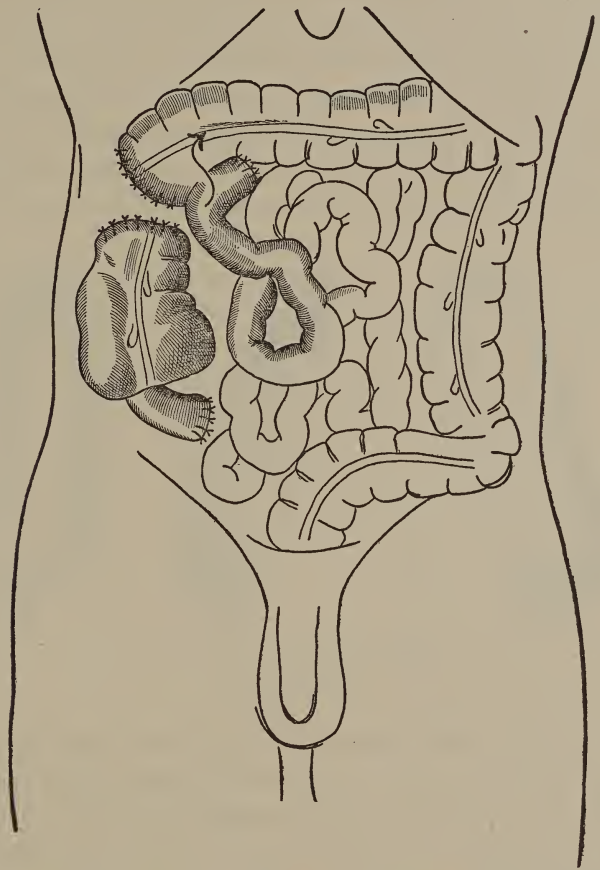


Irreducible Chronic Ileo-Cæcal Intussusception. Before Operation. (Baracz.)

Centralblatt für Chirurgie.

Murphy $\frac{59}{\text{May } 26,'94}$ states that in order to attain good results in intestinal approximation we must consider the means of: 1. Securing accurate contact of surfaces. 2. Producing speedy and permanent adhesion of the approximated portions. 3. Maintaining an opening sufficiently large for immediate purposes. 4. Producing a cicatrix that will not contract to a deleterious degree. 5. Accomplishing all of these in the most simple and rapid manner.

He classifies the methods used for intestinal anastomosis as: 1. Suture. 2. Suture, with mechanical aid. 3. Mechanical means. The author quotes a number of observations made upon dogs, and concludes that end-to-end anastomosis, done by means of the Czerny-Lembert suture, of necessity results in some stenosis of the



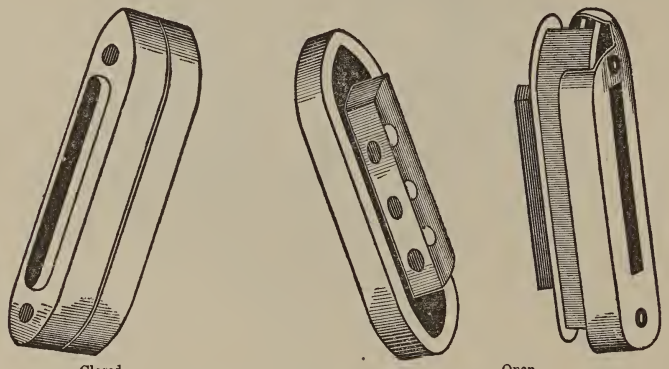
Irreducible Chronic Ileo-Cæcal Intussusception. After Operation. (Baracz.)

Centralblatt für Chirurgie.

bowel; while observations, also made upon the dog, at the end of sixty days after anastomosis by the Murphy button, showed a linear cicatrix with no appreciable contraction. This absence of contraction Murphy ascribes to the fact that the button insures primary union of at least some of the coats of the intestine, and that a minimum production of scar-tissue is the consequence;

while the contraction by which other methods are succeeded is due, in many cases at least, to the normal behavior of the dense cicatrix formed by granulation of the intestinal wound during and subsequent to its healing.

Murphy well says that, in making a comparison of the results obtained by the various methods employed in producing intestinal approximation, there are certain conditions which cannot be accurately estimated, and which must always cause an element of doubt as to the reliability of the deductions drawn from statistics alone. The first of these conditions is the frequency with which unfavorable cases are omitted from the reports, contrasted with favorable ones; second, the condition of the patient at the time of operation,



OBLONG BUTTON. (MURPHY.)
Medical Record.

as some surgeons will undertake a serious operation when the patient is moribund, while others will operate only under favorable circumstances; third, the anatomico-pathological conditions for which the operation is performed; fourth, the ease with which a means of producing approximation can be applied increases the frequency of its use, as it is resorted to in desperate cases where more complicated measures would not be attempted, thereby increasing the chances for a greater percentage of unfavorable results; fifth, the dexterity of the operator. He then gives tolerably complete statistics of operations performed upon the intestines within the past five years, and groups them according to the means used in making the anastomosis. The statistics of the various operations in which the button has been used are quoted,

and the results compared with those of other methods. In order to provide a larger orifice in gastro-enterostomy, the author has devised an oblong button five-eighths inch in its longest diameter. (See illustration.) The reported cases as collated by Murphy certainly show, in immediate results, a great diminution in mortality; but, unfortunately, in no instance has a complete observation, including an autopsy, been made at a period sufficiently remote to warrant the conclusion that contraction does not occur.

Murphy deduces the following conclusions from a study of the cases: 1. The more rapidly the operation is performed, the less the danger from shock. 2. The less the manipulation and exposure of the intestine, the less the danger of infection, post-operative paralysis, and adhesions. 3. The more uniform and continuous the pressure at approximation, the greater the assurance of adhesion and the less the liability of infiltration. 4. A line of approximation is as good as half an inch. 5. Mechanical means in the last five years have produced better results than the suture, in both lateral and end-to-end approximations. 6. The mortality in end-to-end approximations is much less than in lateral apposition, and should always be given the preference. 7. The more perfect the juxtaposition of the various layers, the less the interposition of fibrous tissue, and the more complete the regeneration across the line of union. 8. The juxtaposition of the similar histological layers of the wall of the intestine is an assurance against cicatricial contraction. 9. The more extensive the approximation surface, the larger the fibrous deposit and the greater the contraction. 10. The contraction with end-to-end is less than with lateral approximation.

Chaput and Lenoble $\frac{7}{\text{No.11,'94}}$ publish the diameters of various parts of the small and large intestines, measured upon the cadavera of persons dying at different ages and from a variety of diseases. They further quote eminent anatomists, and, comparing these figures with the dimensions of the largest of Murphy's buttons, find that the diameter of this button exceeds the average diameter of the narrowest part of the small intestine. They conclude that without further information it is imprudent to use the largest of the buttons, and for stronger reasons the elliptical button. This objection to the button was very early urged upon *a priori* grounds, but has not been sustained by the facts of

experience. The objections to the button so far published [96 Jan.,'96] have occurred chiefly in connection with its use in gastro-enterostomy. Here in several cases the button, instead of traversing the intestine and escaping, has fallen into the stomach and remained there, or has lodged in that part of the intestine between the anastomosis and the pylorus. It is also to be noted that the first accident has occurred where the anastomosis was made through the posterior wall of the stomach, as well as the anterior. In another case the opening in the button used, after resection of the large intestine, became plugged by fæces, and before the button was eliminated the patient succumbed to the acute obstruction so created.

Several operations for fæcal fistula in which it was used have failed, some difficulty being experienced in removing the button from the sinus. Plugging of the button by hard fæces may be provided against by emptying the intestine prior to operation, in most cases not already suffering from acute obstruction; and as for the removal of the button from a fæcal fistula, it will never be necessary where operation for its closure has been successful, and may be made the first step in the second operation undertaken for its closure.

We look forward with interest to the publication of a final result,—an autopsy report of the size of the anastomotic opening made by the Murphy button, at a period sufficiently remote to justify conclusions.

APPENDICITIS.

Joseph D. Bryant [1150 '94; 1 Apr.4,'94] discusses the relation between the gross anatomy of the appendix and the clinical history of appendicitis. He states that in but 3 instances out of 144 operations made for diseases not connected with the appendix was the appendix found outside of the peritoneal cavity. In 66 examinations, 40 per cent. of the appendices were free, in that one-half of the entire length was surrounded with peritoneum. The remaining 40 had mesenteries to upward of an inch in length. He believes that the length and freedom of movement of a diseased intra-peritoneal appendix exercises an important influence on the intensity and area of the pain; further, that the situation and extent of the diseased appendix has much to do with the location of the tumor, in

point of tenderness. His conclusions are: First, that the location, direction, and extent of the appendix have an important bearing on the clinical history of appendicitis. Second, that the well-recognized variations of the appendix in length, direction, and location, and the varying sight of the cæcum make the establishment of a definitely-situated diagnostic point of tendency unwise and misleading. Gage [99 May 24,'94] also concludes that McBurney's point is valueless because the tender spot is so changeable, and that general abdominal distension is the most dangerous symptom. After one recurrence others may generally be expected. George M. Edebohls [462 Apr.,'94] believes that the normal vermiform appendix can be distinctly palpated not only in the female, but in the male. The line of the right iliac artery,—the region of the appendix in the cæcum,—whatever course it may take, is almost always at McBurney's point. The normal appendix is found about a finger's breadth outside of the artery, on a line between the umbilicus and the anterior superior spine of the right ilium.

Senn [61 Mar.24,'94] differentiates a class of cases as appendicits obliterans which he concludes "is a comparatively frequent relapsing form, characterized by progressive obliteration of the lumen of the appendix. In these cases immediate radical operation should be performed." Ribbert found in 400 post-mortems (death being due to other causes than appendicitis) partial or complete obliteration in 25 per cent.

Da Costa [9 May 26,'94] has seen a large number of catarrhal cases cured by medical treatment; but when the disease advances to pus-formation surgical treatment will be needed. Pus may be recognized not so much by the increased temperature and pulse as by the entire history of the case, the greater variability of the symptoms, severe and recurrent pains, particularly by the kind of pain (colicky), and by the increased tenderness. "If we err, let it be on the side of too early rather than on that of too long delayed operation." Murphy [1 Oct.28,'93] concludes, from 110 cases, that during the first twenty-four hours the unvarying signs are: sharp pains on the right side, nausea, vomiting, and local tenderness. Fowler [9 Nov.25,'93] reports 3 cases, from 140 operated upon, males, aged 35, 19, and 16 years, where pain was more marked on the left side of the abdomen, especially at the outer border of left rectus. At the operation the appendix was found to the left of the rectus.

Bull [59 Mar.31,'94] reports 18 cases of removal of the appendix, during the interval between attacks, with 1 death, and collects 450 operations with 8 deaths,—a mortality percentage of $1\frac{7}{100}$. He says: "This mortality would be raised to over 2 per cent. if I could include 4 other fatal cases of which I have indirectly been informed. If we look at the record of individual surgeons and strike an average, we should say that 5 or 6 per cent. would be a fairer estimate. Over 80 per cent. of operations have been performed in this country, and 341 cases have been communicated to me by the operators themselves. These figures convey another impression to my mind, which is that we have a large amount of material stored up in private and hospital note-books which could with great advantage be subjected to study and analysis. The absence of such studies by men whose experience has been ample leads me to think that they are yet in doubt as to many points in the natural history, diagnosis, and treatment, while the success of operative methods leads to their frequent adoption. We need more carefully recorded cases, not only of the patients who come to operation, but those who have successive attacks relieved by medical measures. There are many gaps to be filled between the position of the surgeon who operates only when there are definite symptoms of chronic disease which have been found by operation to correspond with definite lesions of the appendix, and those who resort to operation after one or two attacks in individuals who have no symptoms, because they believe future attacks must occur in the order of nature and must endanger life. The position of the former may be too conservative, but I think it is 'up to date' with the knowledge we have at present. The attitude of the latter is unscientific, as their statements are not borne out by demonstration."

Wyeth [1 June 30,'94] describes appendicitis as strictly a surgical lesion. After referring to the leading articles on the subject published during the year, he makes a strong plea for early operative interference. He states that in his entire experience he has yet to see a death which could not properly be ascribed to delay in timely and skillful surgical interference. He believes that every case from the very beginning should be treated by a surgeon, with a medical attendant, and cites two recent cases to strengthen his position. From the reported cases of the leading surgeons he

calculates the mortality of appendicitis at 18 per cent. in a total of 364 cases.

Robert T. Morris [1150 Jan.,'94; 1 Apr.14,'94] advocates a very small incision, an inch and a half in length, for appendicitis, with a very short period of confinement in bed, allowing his patient to be up in about a week and a half. Incision is made through the right semilunaris and all the structures of the abdominal wall. The mesentery of the appendix is ligated very close to the cæcum with fine silk, the ligated stub is then buried with three Lembert sutures, and the abdominal wall is closed with separate layers of fine catgut.

McBurney [2 Aug.11,'94] advocates an oblique incision in the skin crossing a line drawn from the anterior iliac spine to the umbilicus, nearly at a right angle, about one inch from the iliac spine. The section of the exterior oblique muscle and aponeurosis should correspond, but no fibres should be cut across. These edges should then be retracted and the fibres of the internal oblique muscle and transversalis be separated in a line parallel to their course. The muscular and tendinous fibres being separated and not divided, the muscular action will rather approximate than draw apart the edges of the wound. This method requires a little more time, but there is very little hæmorrhage. It is not suitable for suppurating cases where there is need of a larger incision, but is indicated rather for simpler cases.

Demoulin [2 July 28,'94] reports a case of appendicitis with perforation and acute general peritonitis. After operation there was recovery.

Carston, of Detroit, [1 Aug.25,'94] reports a case in which he removed the appendix for colic. The patient was 24 years of age, male, and had had frequent attacks of abdominal pains in the region of the cæcum. The attacks had occurred at intervals for several months. The appendix was constricted at the base and was removed, nothing being found inside. The patient had had no subsequent attacks up to the date of the report, four months after operation. Roswell Park [451 Apr.,'94] reports a case of operation for relapsing appendicitis in a youth 18 years of age. Uneventful recovery followed. T. W. Huntington [47 Jan.,'94] reports ten cases of operation with two deaths; five were operated upon during the quiescent period, and all recovered.

H. H. Lloyd Patch [6 Mar.24,'94] reports a case of typhlitis with peri-

typhlitic inflammation and abscess, operated upon with recovery. A careful reading of the report makes it seem very probable that the case was primarily one of appendicitis.

J. M. Barton [144 May,'94] advocates incision, protection of the peritoneal cavity, and drainage in cases of ruptured appendicitis, with abscess. In fourteen cases reported, in none of which an attempt was made to find the appendix, no symptoms of recurrence have been observed in the two years or less which have elapsed since the operation. Among the fourteen cases so treated there was no death.

Treves, [6 Mar.19,'94] in a case of ulcer of cæcum, with perityphlitis and suppurative pylephlebitis, performed explorative laparotomy, making an incision in the right semilunar line; no peritonitis nor ascites was found. Recovery followed this simple incison. It is suggested that, in this case, cure depended upon an alteration brought about in the state of pressure within the abdomen, whereby the circulation was amended and the conditions associated with absorption substantially modified. Lanphear [199 Sept.,'94] observed a case of ulcer of the cæcum, with perforation, perityphlitic abscess, and symptoms simulating appendicitis, but in which the appendix was found to be normal.

Krafft [197 Dec.20,'93] reports two successful cases of operation for recurrent appendicitis. One patient had had nine attacks. J. E. Moore [105 Dec.1,'93] also performed a successful operation during the interval between attacks.

Gage [99 May 24,'94] regards the indiscriminate administration of salines as dangerous and believes that the appendix should be removed, for it adds very little to the immediate danger of the operation and much to the permanency of the recovery. In recurrent cases operation should be performed in the quiescent intervals; the earlier the operation, the less danger and less need of drainage and the firmer the abdominal wall. Surgeons seldom regret an early operation, but are often disappointed by delay.

Burrell, [99 May 3,'94] in the after-treatment of operations for appendicitis, prefers sufficient morphia to keep the patient quiet and does not use salines unless the temperature rises. He uses peroxide of hydrogen for cleaning the wound and prefers gauze strips for drainage.

Noble [74 Sept.,'94] reports the case of a robust male, aged 40 years,

who declined to have any operation, but allowed an aspiration, ½ pint (250 cubic centimetres) of thick, offensive pus being removed. He made a good recovery.

Jonas [106 Dec.,'93] believes the majority of cases of perityphlitis to be non-suppurative and amenable to medical treatment. McRae, of Atlanta, Ga., [207 June,'94] says: "There is no question in my mind that by far the largest number of cases of appendicitis get well without operation, and without falling into the hands of the surgeon." He advises immediate operation in the "fulminant" cases.

Jones [1154 Apr.,'94] reports a case of appendicitis, operated on the sixth day, in which the following complications occurred: Pericarditis, pleurisy with effusion, cystic empyema, aneurism of the ascending aorta, with fatal rupture three and one-half months later. Hanna [147 Oct.,'93] reports a case of appendicitis complicated by a perforation of the colon. Cameron [213 Aug.,'94] records a case in which the vermiform appendix communicated with the bladder; an operation was performed, and recovery ensued. Abbe [96 June,'94] reports a case of intestinal obstruction, twelve days after operation for appendicitis, where the small intestine was adherent at the site of the appendix. Gerster [96 June,'94] reports a similar case, and Page [6 Aug.11,'94] one in which there was a fatal result. Rand [157 Dec.,'93] found a perforated appendix in the sac of an irreducible femoral hernia which proved fatal. Councilman [99 May 3,'94] reports a case of congenital absence of the appendix, observed at autopsy. Davis [647 Mar.,'94] reports a case of persisting fistula two years after spontaneous external opening of an appendix-abscess; this was drained, and a gradual closure was produced with caustics. Three months later there was a second attack, with acute suppuration, and incision gave exit to 12 ounces (373 cubic centimetres) of pus. The wound was packed with gauze and recovery ensued. Ashton [12 Mar.,'94] found the fin of a fish in the appendix. Markoe [96 Dec.,'93] found a large black pin; Ramsohoff, [426 Nov.,'93] a 32-calibre cartridge; and Wyman, [1 Mar.10,'94] a large white bean. Operation in all these cases was followed by recovery. Jonas [59 Mar. 3,'94] describes the case of a female, aged 49 years, presenting symptoms simulating appendicitis, with a distinct tumor, the size of a hen's egg, at McBurney's point. The bowels moved freely, pain was constant, with chill, and temperature 102° F. (38.9° C.); no vomiting. At the operation the intestines were found matted by very firm extensive adhesions about the tumor, but there was no

pus. The appendix was normal. The tumor simulated a neoplasm and it was impossible to remove it; so the abdomen was closed and a fatal prognosis given. Thirty days later the patient passed by the rectum an enterolith the size of a lemon, hard as stone, of irregular contour, and black as tar. Recovery then took place.

INJURIES OF THE ABDOMEN.

Gunshot Wounds.—J. D. Griffith, of Kansas City, [72 Feb.,'94] has made a series of experiments on live dogs, and beef intestines inclosed in leather bags, in order to compare the wounds caused by large leaden bullets and those caused by the hard, small, conical bullets of higher velocity now employed in all modern armies. It has been said that this change will increase the mortality and the number of wounded, but that the wounds, as a whole, will be less grave and more humane. Griffith concludes that the "humanity" of the new gun is less than doubtful; at any rate, at distances of less than five hundred yards. In the five cases in which a large dog was employed, the animal died instantly when struck, without uttering a single cry. The muscular tissues for nearly two inches on all sides of the bullet-track seemed absolutely destroyed; a wound of the liver was of a stellate character, with fissures radiating in every direction. The intestinal wounds of entrance and exit were much larger than the bullet. At one hundred yards the abdomen, when opened, looked as if an explosion had taken place within it, and a section of gut twelve inches long was completely severed, mesentery and all. Wherever a vessel was struck the opening was clean cut, as with a knife, without any curling up of the inner coat; so that hæmorrhage would cease only with the stoppage of the heart-beat.

Sarrentino [336 July 28,'94] enlarges a wound of the abdominal wall, whether a stab or shot wound, explores the peritoneum, and if the latter be involved he widens the wound and examines the viscera. He reports 16 cases of penetrating wound of the abdomen operated upon by laparotomy, with but 1 death. In 11 of the cases no visceral injury was found; in 3 the small intestine was wounded; once the stomach was opened and once there was hæmorrhage. Of 35 cases of wound of viscera in the Naples Hospital, submitted to laparotomy, 23 died. Décaux [243 May,'94] reports a case of penetrating bullet wound of the abdomen causing death,

where, at autopsy, only a few clots of blood were found in the abdomen, and no wound of the viscera was discovered, though one or two coils of intestine presented the appearance of having been contused.

Councilman [99 July 26,'94] reports an autopsy upon a case of gunshot wound of the abdomen previously described. [2085 P.2,p.78] The patient was supposed to have recovered from a wound of the colon. Autopsy disclosed no evidence of peritonitis, except about the ascending colon, where the gut was bound down by cicatricial tissue and the mucous membrane of the colon at this point was puckered, but without any scar. The reporter concludes that the colon was not wounded.

Albert B. Miles [96 Dec.,'93] reports 13 cases of gunshot wounds of the intestines, treated in the Charity Hospital at New Orleans, some being transported into the city by railroad. The condition of some of the patients at the time of operation was almost moribund. Of the 13 cases, all but 1 were wounds of the small bowel, most of them of great gravity. Eight cases died, 5 recovered. Of 3 cases that recovered, 1 had sixteen wounds of the small intestine, 1 fourteen, and another ten, and it would seem almost impossible to imagine that recovery could have taken place in these cases without operation. The after-treatment is considered all important. During the first twenty-four hours only cracked ice was allowed and stimulants. On the second day the patients were fed with chicken-broth at intervals of two to four hours. Tender meats, in small quantity, were allowed the second week. Rectal feeding with predigested foods and alcohol was practiced.

Von Bramann [336 No.30,'93; 99 Apr.26,'94] reports eight cases of gunshot wounds of abdomen and has reached the conclusion that laparotomy is imperatively demanded in all cases of gunshot wounds of abdomen in which there are signs of injury of the intestine or stomach, or of severe internal hæmorrhage. The indications for operation are sufficient if the direction of bullet makes a wound of stomach or small intestine probable or even possible. In 90 per cent. of such wounds of the stomach death is inevitable under any form of expectant treatment. The operation should be performed as soon as possible after the injury. Hæmorrhage from wounds of liver and spleen should be controlled by plugging.

Penetrating Wounds.—L. A. Stimson [96 Jan.,'94] reports a case of stab wound of the abdomen, with multiple wounds of the intestine, in which recovery followed operation. The patient was a youth, aged 18, and the wound was situated a little below and to the right of the umbilicus. On opening the belly, more than a quart of blood was found in the abdominal cavity. Three wounds of the small intestine, each about one-third of an inch in length, also two wounds of the omentum and one of the mesentery, were closed by a single row of Lembert's silk suture. The patient made an uninterrupted recovery. I. E. Clark [2013 May 2,5,'93] reports a case of stab wound of the abdomen in which it was necessary to remove one-third of the greater omentum. The patient recovered. The wound in the abdomen was five inches long, and through the opening the entire small intestine, with a portion of the large intestine and omentum, protruded, a lot of shavings having penetrated the omentum. The intestines were covered with 2½-percent. solution of carbolized warm water. The abdominal cavity was washed out with hot water. It was found necessary to remove about one-third of the omentum, and the intestines, having been carefully cleansed, were replaced in the cavity and the wound closed. The patient was allowed to walk around the house on the eighth day, and on the nineteenth day he was performing his regular occupation as waiter at the hotel. He was perfectly well three years after operation.

R. K. Smith [81 Feb.,'94] reports a case of penetrating knife wound of the abdomen in which the descending colon was wounded, protruded, and strangulated. The patient was a negro aged 25, and the external wound was in the left side, just below the ribs. He was suffering from severe shock at the time of operation, and the wound was covered with clotted blood and fæces. Uninterrupted recovery followed operation.

Robert Jones [6 May 5,'94] reports two successful cases of operation for penetrating wounds of the abdomen following operation. One case was a wound of the liver caused by falling against a knife. The abdominal cavity was found absolutely full of blood-clot. The wound in the liver was an inch and a half long and an inch deep. There was slight jaundice the third day of the operation, otherwise recovery was uninterrupted. The second case was a wound of the abdomen penetrating the diaphragm and involving

the pleural cavity. The patient was a boy of 11 years, and injury was caused by falling upon a stick, which penetrated about eight inches. The abdominal contents were found uninjured. The abdomen was washed out and drained; with exception of purulent bronchitis of short duration recovery was rapid and complete.

Dum-Popescu $^{996}_{\text{Aug.25,'94}}$ reports a case of penetrating wound of the abdomen by a sharp instrument, causing a strangulated hernia of the omentum. Laparotomy with resection of the omentum and irrigation of the peritoneal cavity with distilled water resulted in recovery.

Contused Wounds.—Wiggin $^{1}_{\text{Jan.20,'94}}$ reports a case of rupture of the ileum operated upon on the third day in the presence of purulent peritonitis. The patient died. A second case of rupture of the ileum, due to the kick of a horse, was operated upon at the end of about thirty hours. The affected portion of the gut was excised, and the divided bowel sutured by Maunsell's method. Recovery was uneventful.

Allingham, $^{2}_{\text{May 5,'94}}$ in discussing the subject of intestinal rupture by contusions of the abdomen, mentioned a case where he had sutured a rent in the mesentery one foot in length and parallel with the bowel. Death ensued, and at autopsy necrosis of the affected intestine was found. Nimier $^{2}_{\text{Dec.16,'93}}$ emphasizes the necessity of unremitting observation of every patient injured by severe contusions of the abdomen, and urges interference by abdominal section before the peritoneum is hopelessly involved.

W. H. Battle $^{6}_{\text{May 5,'94}}$ reports a case where, from the kick of a horse, though no external wound existed, he found rupture of the small intestine at two points. Six hours after the injury he resected and performed lateral anastomosis at the site of one rupture, closing the other, which was clean cut, by the end-to-end method. Senn's plates were used in both instances. The patient did well for four days, but died on the sixth, and it was found that there was leakage in both suture-lines.

Bloodgood, Finney, and Halsted $^{764}_{\text{Mar.,'94}}$ presented a case of contusion of the abdomen at a meeting of the Johns Hopkins Society. The injury was the result of a severe crush, and consisted in rupture of the right rectus and flat muscles at the umbilical level, and very general subperitoneal hæmorrhage was demonstrated by laparotomy; the intestine, however, was not injured. The patient

made an uneventful recovery. Demoulin [17 Oct.7,'93] enumerates the various degrees of rupture of which the rectus abdominis is capable, points out the features which distinguish partial from total ruptures of the muscle-fibres, and shows the difference between this lesion and rupture of the sheath alone. The latter condition he terms false hernia of muscle, reserving the name hernia for a similar condition not the consequence of injury.

Frederick Holme Wiggin [1 Jan.20,'94] reports two cases of contusion and rupture of the ileum, with peritonitis, without external wound. One case was successfully treated by cœliotomy and primary enterectomy, followed by circular enterorrhaphy (Maunsell's method). The patient was 14 years of age, and had received a kick from a calf in the right lumbar region. On the following day he was suddenly seized with violent, colicky pains, nausea, and vomiting. The third day he continued to grow worse, and showed evident signs of general peritonitis. A diagnosis of intestinal rupture with general suppurative peritonitis was made, and on opening the abdomen a large amount of pus was found in the cavity, shut off at various points by adhesions, and a rupture of the ileum, which was closed by Lembert sutures. The general cavity was washed out with a weak solution of hydrogen dioxide, the external wound partially closed, and iodoform gauze employed. The patient died six hours after the completion of the operation. The second case was that of a colored boy, 15 years of age, who received a kick from a horse in the right lumbar region, and was found lying on his stomach, groaning. In about ten minutes he began to vomit and had constant nausea. The vomit at first consisted only of food, but later of dark, clotted blood. On the following day he had well-marked signs of peritonitis. A median incision was made and a knuckle of small intestine, greatly bruised, with a small perforation near the mesentery, and six inches of the bowel were excised. During the operation the patient came out of the ether, and the straining, while attempting to vomit, caused a quantity of blood and fæcal matter to escape into the peritoneal cavity. The cavity was freely washed out with hydrogen dioxide, which was allowed to remain some time before removing it. The abdomen was finally flushed with hot, sterilized salt solution. The wound was closed without drainage. Uninterrupted recovery followed.

SPLEEN.

James P. Warbasse [96 Aug.,'94] gives an exhaustive review of ancient and modern literature of the spleen. He finds 117 reported splenectomies for all causes, with 58 deaths. Separating these into two groups, that containing leukæmia, chronic congestion, and amyloid degeneration presents 32 cases with 29 deaths; and in the 3 leukæmic cases living when reported the disease was slight or even doubtful. He concludes that the leukæmic spleen is absolutely not suitable for operation when the blood-cell ratio is 1 to 50 or worse. In most of the cases which survived a few days the white cells increased very rapidly. The second group of splenectomies includes wandering spleen, simple and malarial hypertrophy, abscess, simple and echinococcous cysts, sarcoma, syphilis, and rupture. Of these 85, 29, or 34.1 per cent., died. The author finds nothing in the study of these cases or the reported physiological experiments on animals' spleens to justify Virchow's hypothesis that white cells become red cells in the spleen, although they doubtless undergo disintegration there. He concludes further: "In acute general anæmia the spleen shows signs of increased activity. Removal of the spleen causes a transient decrease in the number of the red and increase in the number of the white blood-cells. It also retards the regeneration of blood after hæmorrhage. The thyroid gland has no vicarious relation to the spleen. The lymph-nodules and the bone-marrow acquire an increased blood-forming activity after splenectomy." He urges all operators to make careful blood examinations before and after removal of the organ.

A. Zuccarelli, of Naples, [814 May 1,'94] gives a complete table of the reported splenectomies in Italy from 1874 to 1893. There were 39 cases with 25 recoveries, 2 of the deaths occurring in leukæmic cases (the only leukæmic cases operated upon). Of these 39 cases 7 only were males. A more favorable record is presented by Tricomi. [9 July 28,'94] Of 8 cases 1 was leukæmic, the blood-count varying from 1–30 to 1–10. Death ensued four hours after operation. The others all recovered,—1 wandering spleen, 3 malarial, and 3 simple hyperplasias. His usual incision is one curving from the inferior border of the seventh left rib to the anterior superior iliac spine. The hilus of the spleen was ligated *in situ* in three or four divisions. In 1 case of leukæmia (1 to 70) the

splenic artery was ligated, death occurring on the forty-fifth day. The spleen was gangrenous.

Jokolew [21 Dec.23,'93] has collected 94 instances of splenectomy with 58 deaths and 36 recoveries. To this group he adds a case successfully operated upon by himself. The spleen presented a blood-containing cyst.

E. Malins, of Birmingham, [6 Sept.15,'93] removed an enlarged spleen, from a woman of 30 years, six days after the onset of symptoms simulating acute peritonitis. The spleen was rotated one-half turn on its axis, weighed 2 pounds 5 ounces (1.3 kilogrammes), and the vessels in its pedicle were completely thrombosed. The abdomen was closed and recovery was prompt. Six months later the blood-count showed a ratio of 1 to 66.

W. J. Conklin, of Dayton, Ohio, [59 July 28,'94] performed splenectomy upon a multipara, aged 29, in whom a wandering spleen had caused much trouble for two months, being easily palpable *per vaginam*. The condition had been recognized at an oöphorectomy performed three months previously. The acute splenic symptoms commenced two weeks before operation. The 4-pound (2 kilogrammes) spleen was found attached to the parietes of the omentum and intestines, and was twisted three times on its pedicle. Seven months later the blood was normal and the patient, except for great drowsiness, was in excellent health.

Hartmann [26 July 2,'94] removed, at the onset of acute symptoms, the spleen of a girl of 18 years with a marked malarial history. The organ was adherent, twisted twice on its pedicle, and weighed nearly 5 pounds (2.5 kilogrammes). The fluid in the peritoneal cavity was sterile. Fourteen months later the patient's health was perfect, but the ratio of white to red blood-cells was constantly increasing.

H. Treub [41 Apr.30,'94] publishes a successful case of extirpation where the spleen lay in front of the uterus surrounded by adherent intestines. Heurtaux, of Nantes, [91 Feb.,'94] lost a case, apparently from shock, three days after operation. This spleen was also twisted upon its long pedicle, causing symptoms like those occurring when an ovarian cyst is twisted.

Trinkler [5 Apr.,'94] reports a case of solitary hydatid cyst of the spleen which was successfully treated by Volkmann's operation. He is much opposed to the practice of puncturing an abdominal

hydatid cyst, and holds that such a practice is very dangerous, whether used for purposes of diagnosis or treatment. Several cases are referred to in which a simple puncture of a tense cyst was followed by acute peritonitis and death. He advocates a long incision so that the operator may clearly see the condition of all parts of the tumor before deciding on the method of treatment. Pozzi's operation is the ideal one, as the cyst is removed entire.

W. Wagner, of Königshütte, [336 July 28,'94] reported to the German Surgical Congress an operation for a rare case of primary sarcoma of the spleen. The incision was median, removal was easy, and recovery perfect. Six months later the blood was normal. Of the 4 previously-recorded cases of removal of the spleen for sarcoma, 1 died from hæmorrhage, 2 of recurrence, and 1 was cured. A. d'Antona, of Naples, [814 May 1,'94] has since reported a sixth case, with recovery. In his case the fibrosarcoma was distinctly encapsulated in the soft splenic tissue.

PANCREAS.

P. Zweifel, of Leipzig, [317 July 7,'94] removed a pancreatic cyst from a woman of 64 years. The cyst was in the tail of the pancreas and was adherent to the overlying omentum. It was ruptured in bringing it out of the abdomen, but its contents did not escape into the peritoneal cavity. The cyst-bed was accurately stitched up and the abdomen closed. There was slight reaction and the urine contained sugar for a month after the operation. A good recovery took place. The cyst contained 1½ litres (quarts) of clear, pale-yellow fluid, which possessed a diastasic ferment alone. Twelve previous extirpations are recorded, with 5 deaths,—1 of collapse, 1 of pericarditis, and 3 of septic peritonitis. Of the 31 recorded cases of cyst treated by drainage, only 2 were fatal; but, in many, troublesome fistulæ persisted. Successful cases of incision and drainage are reported by Gussenbauer [336 May 26,'94] (two cases) and McBurney, of New York. [96 Apr.,'94] J. L. Thomas [6 Mar.31,'94] had a case, in a boy aged 2 years, resulting from a street accident, a cab-wheel passing over the abdomen. The shock at the time was moderate, but three weeks later a tense tumor appeared in the left upper quadrant of the abdomen. By aspiration 38 ounces (1.2 litres) of a dirty bronze-colored alkaline fluid were withdrawn; it was highly albuminous and had a slight amylolytic

action. Recovery was prompt. From experiments upon cadavers Thomas is convinced that this fluid was contained in the lesser peritoneal cavity, and not in a pancreatic cyst, an obliteration of the foramen of Winslow preventing its extension into the general peritoneal cavity. W. H. Brown $_{\text{Jan.6,'94}}^{6}$ treated an almost similar case in a man pinched between a locomotive and a car. A small incision was made and bloody serum escaped from the general peritoneal cavity through a glass drain for six days. Then pain and distension of the upper part of the abdomen rendered a second operation necessary. The omentum was drawn up, a tense cyst was exposed, and 3 pints (1½ litres) of fluid, which proved to be only bloody serum, withdrawn. The wall of the cyst was stitched to the abdominal wound, a drain inserted, and the patient recovered.

Boldt, of New York, $_{\text{Aug.,'94}}^{462}$ reports a case of cyst of the pancreas secondary to carcinoma of that gland. The cyst contained 8 quarts (litres) of chocolate-colored fluid. The cyst-wall was stitched in the abdominal wound and the cavity packed with iodoform gauze. Death took place from collapse. W. W. Ashhurst, of Chihuahua, Mexico, $_{\text{Apr.7,'94}}^{9}$ and J. E. Walsh, of Denver, $_{\text{Dec.30,'93}}^{9}$ each records a successful case of abscess of the pancreas with partial necrosis, treated by incision and drainage.

Nimier $_{\text{July 10,'94}}^{91}$ suggests the establishment of an intestinal fistula in cases of simple pancreatic cyst. W. Körte $_{\text{June 4,'94}}^{41}$ advocates lumbar drainage in retroperitoneal pancreatic abscesses.

HERNIA.

Radical Cure.—Ed. Bassini, of Padua, $_{\text{B.47; Oct.,'94}}^{226\ 96}$ whose operation for inguinal hernia has become recognized throughout the world as the best yet devised, has also recently brought out a new operation for femoral hernia, which may be briefly described as follows: An incision parallel to Poupart's ligament and over the centre of the tumor is made, and the sac ligated high up and removed. With a curved needle three silk sutures are used to unite Poupart's ligament with the pectineal fascia, the first being placed near the spine of the pubis, the second one-half centimetre externally, and the third one centimetre from the femoral vein. These sutures are not tied until four other sutures are passed through the edge of the falciform fascia, then the pectineal fascia, the lower

suture entering just above the saphenous vein; the upper sutures draw Poupart's ligament backward to the pectineal line and close the mouth of the canal; the other sutures bring together the anterior and posterior walls of the canal. The skin is then sutured and no drainage is used. Bassini, in marked contrast with most other surgeons who have proposed new methods for operations on hernia, has waited, before publishing his work, until his theories have been verified by results. He has performed 54 operations on 51 individuals, with no mortality, the patients being kept in the hospital from eight to twenty days; 41 cases have been traced from 1 to 9 years, and no relapse has occurred.

A. M. Phelps $_{\text{Sept.8,'94}}^{1}$ describes a new operation for hernia, and reports five cases operated upon by this method. The steps of the operation are as follow: "A long incision is made, extending at least two inches beyond the internal ring, through the muscles down to the transversalis fascia. The sac is opened and the intestine replaced. In the thin sac the suture should be passed, with a needle around its neck like the puckering-string of a pouch, and two-thirds of the sac or a little more cut away, the stump inverted with forceps into the abdominal cavity, and the ligature tightened. This secures the stump within the abdominal cavity and prevents dimpling of the peritoneum. A single stitch or two across the neck of the sac is now necessary. The muscles are carefully dissected up from the transversalis fascia a distance of an inch and a half either way from the internal ring, which is a hole in the transversalis fascia, and is enlarged by the pressure of the intestine. In order to sew up this internal ring the edges of the fascia should be denuded and two parallel longitudinal incisions made from half an inch to an inch on either side (or, in cases where the fascia is thick and adherent to the sac, it can be included with the ligature and inverted with the sac into the abdominal cavity). It will then be easy to bring the fasciæ together over the stump. The fascia should be stitched with interrupted fine-wire sutures, and over it, if the opening is large, loops of silver wire should be placed. The silver wire should be knotted in several places to prevent slipping. Four or five of these loops, two or three inches in length, will suffice. The cord should be raised from the canal and the loops passed underneath the cord from the internal to the external abdominal

ring. Over these loops of silver wire or catgut the transversalis muscle is carefully stitched with interrupted sutures, the cord being brought through the muscle direct. The first layer of wire or catgut should run transverse to the inguinal canal. Over the transversalis muscle another layer of wire loops is passed, extending at right angles to the deeper layer between the transversalis fascia and the internal oblique. Each one of these loops of wire is stitched to the muscle to prevent it from slipping. Over this layer of wire the internal oblique is carefully stitched with interrupted sutures. The cord should be brought through the internal oblique muscle. The external oblique is stitched together, and if there is a thick layer of superficial fat of two or more inches the wound is dressed open; if there is but little adipose tissue the wound is closed. A small drainage-tube or two strands of catgut should be inserted down into the sac when this has been inverted into the abdominal cavity; but when the sac has been cut away, a few strands of catgut, passing to the deeper layers of muscle, will suffice for drainage."

All of the cases were recent (within a few months), and, although no relapse had occurred, it is too early to speak of final results. The objections to this method are: (1) the danger of inverting a large thick sac within the abdominal cavity; (2) the possibility of so large an amount of silver wire buried so near the surface causing irritation and slow-healing sinuses. The method seems unnecessarily complicated.

Bünger [301 B.38,H.6] has published in detail all the operations done for radical cure of hernia by Küster, at the Surgical Clinic of Marburg, from 1884 to the present time. There were 86 operations in 84 patients,—52 male and 32 female. In 40 cases the hernia was non-strangulated; in 46 strangulated. The mortality in the whole number was 7. One fatal case occurred in a child $2\frac{3}{4}$ years old, with a double irreducible inguinal hernia. Death occurred 48 hours after operation. In 4 other cases death occurred between 2 and 48 hours after operation; in 1 case 5 days after operation, from double pneumonia; in 1 case in 9 days, from carcinoma of the lungs and kidneys. In 33 cases, where the hernia was not incarcerated, 26.8 per cent. healed by primary union,—an average duration of wound-healing of 24 days; 7, or 21 per cent., healed by suppuration, with an average duration of

wound-healing of 44 days. Of 44 cases of incarcerated hernia, 35, or 79½ per cent., healed by primary union, with an average duration of wound-healing of 20 days; 9, or 20½ per cent., healed by secondary union, with an average duration of 25 days.

As to final results, 67 cases were traced, and 61, or 91 per cent., were found free from recurrence from 1½ to 8 years, and 2 months after operation; 6 cases, or 9 per cent., relapsed; 50 cases were free from relapse upward of 2 years after operation. Separating the hernia into inguinal and femoral, there were 48 cases of inguinal hernia, of which 12 were reducible, 19 irreducible, 17 incarcerated. The final result in these cases was six relapses, or 16 per cent. Of femoral hernia there were 34 cases,—1 reducible, 5 irreducible, 28 incarcerated. In 2 cases the final result was unknown. Of the 4 other cases there was no relapse 1½ years after operation. Of the 28 remaining cases (26 male and 2 female), there was no relapse. Two cases of umbilical hernia, one irreducible and the other incarcerated, did not recur.

The method of operation is described as Küster's, and consists in the high ligation of the hernial sac, careful suturing of the pillar of the canal, and accurate wound-suture combined with absolute asepsis.

Sir William MacCormac, in his Bradshaw Lecture for 1893, gives the results of operation for the radical cure of non-strangulated hernia, in 90 cases operated upon between 1874 and 1893. He states that in no instance was a fatal result directly attributable to the operation. There were two deaths, however,—one from broncho-pneumonia, in a child of 2 years; another from cerebral embolism, in a woman of 50 years. In 80 per cent. of the cases the wounds healed by primary union and the average duration of treatment was a little over one month. Silk was used for the buried sutures, which were placed in a way devised by MacCormac himself, so as to include all the deep structures of the abdominal wall over the whole length of the inguinal canal and a short distance above it; 43 cases were ascertained to be without return, and in 28 of these the interval varied from two to six years. In only 4 cases was relapse found to have occurred.

Graff $\frac{96}{\text{May,'94}}$ describes a new method of closing the canal in radical operation for inguinal hernia. As he states, this method is only an adaptation of Lembert's intestinal suture, bringing the

broad, fibrous surfaces in contact with each other, the cut edges of the aponeurosis being inverted.

Poullet [211 Nov.19,'93] describes a new method by which the peritoneum is not opened and the canal is closed by means of a fibroperiosteal flap obtained from the pubic bone. He reports twenty cases, but too short a time had elapsed after the operation to enable one to judge its merits as regards permanent cure.

Gersuny [2 Nov.18,'93] describes a new operation, which is merely an application of his method of closing the abdomen after median laparotomy to umbilical hernia. The umbilical scar and sac—which is usually adherent—are resected, the cut edges of the peritoneum sutured, the sheaths of the recti muscles exposed at their inner margins, which are cut away until the innermost muscular fibres are plainly visible. The muscles are sufficiently freed by dissection to permit of their being brought together without too much tension, and then united with interrupted sutures. The superficial portion of the wound is packed with gauze for a few days.

McArdle [16 Feb.,'94] discusses the operative treatment of such hernia as appear to be the result of congenital defect of the linea alba or as the outcome of laparotomy, reporting some very interesting cases of irreducible and strangulated umbilical hernia.

Schede [22 June 6,'94] uses only silver wire, boiled in a 1-per-cent. solution of soda, in herniotomy. In umbilical hernia, also in laparotomies, he first passes three or four sutures through the entire thickness of the abdominal wall and leaves them for the time untied. He then passes a second row of sutures through the sheath of the rectus muscles and peritoneum, and buries them, tying the first sutures and allowing them to remain ten days. He has used this method in 121 laparotomies of various kinds, and in only 4 have slight hernial protrusions followed. In 163 cases of herniotomy a permanent cure was obtained in 90 per cent.

Boeckel, of Strasbourg, [14 May 2,'94] reports 15 operations for umbilical hernia. The operation was done ten times for non-strangulated and five times for strangulated hernia. Eleven cases had been followed a sufficient time to speak of final results. Of 2 cases operated upon by the older methods without suture of the ring, 1 relapsed, the other remained cured. Of 6 operated upon

by suture of the ring, 5 remained cured and 1 recurred at the end of five years.

Leo Szumann, of Thorn, $^{116}_{\text{Mar.,'94}}$ contributes a paper on the radical operation for large inguinal hernia in small children. He has performed 5 operations on 4 children between 1 and 3 years of age, with 5 cures. He refers to Karewski's 9 cases between 1 and $2\frac{1}{2}$ years of age, all recovered; and Bassini's 6 cases under 2 years, with 5 cures and 1 relapse. One of Szumann's cases has gone six years, 1 four and one-half years, both being still sound. The first 2 cases were operated upon by a double ligature of the sac at its neck and iodoform-gauze tamponade of the canal. In the last 3 operations the external pillars were sutured with catgut.

Lucas-Championnière $^{212}_{\text{Nov.25,'93}}$ reports a new series of 114 cases which, added to his previously-reported cases, make a total of 389 cases. In his first series he had two deaths, in his last series none; 7 of the inguinal cases were females, and of the 114 cases 10 were femoral. The number traced is not stated. In the first series of 275 cases there were 14 relapses in 112 cases traced.

C. B. Lockwood, $^{6}_{\text{Nov.25,'93}}$ in a paper upon the radical cure of inguinal and femoral hernia, reports 57 cases. Of these, 45 were operated upon for non-strangulated and 12 for strangulated hernia. Of the 12 femoral 1 died of acute bronchitis on the sixth day; of the 33 inguinal non-strangulated all recovered and but 2 relapses were noted. The number of cases traced is not mentioned. Silk was used for the buried sutures. Of the 44 recoveries 36 healed by primary intention; of the 8 cases that healed by granulation 5 had suppuration that ended in the extrusion of some or all of the deep sutures and 3 had slight suppuration. In 9 cases Bassini's method was employed; of these, 3 suppurated and in 2 the deep silk sutures were thrown off.

Rushton Parker $^{2}_{\text{Nov.11,'93}}$ reports 250 operations for hernia where an attempt at radical cure was made; 61 of the cases were strangulated and 190 non-strangulated; of the latter there were 8 deaths, or 4.2 per cent.; 137 were inguinal, with 5 deaths; 25 femoral, with 1 death; 28 umbilical or ventral, with 2 deaths. As to final results, he states: "Any trustworthy estimate of the proportion of failures I am entirely unable to make, and can only say that those known to me are a very small minority in femoral

and inguinal cases; the proportion in umbilical cases is, however, considerable." One case operated upon in 1879 was well ten years after. The method of operation employed in his earlier cases was one similar to Czerny's, but worked out independently. One hundred of his cases were operated upon by Macewen's method. As to the age of patients, he says: "I regard infancy and childhood as the time of life above all others in which hernia can best be treated, even if of large size. My only fatality in children was in a child aged 8 weeks, in which the whole of the small intestine had descended into an inguinal hernia." This case was operated on ten years ago, when the technique was far less perfect; and, furthermore, the case was treated as an out-patient. "The younger the patient, among adults, the better the result and the more easily attained; but great as is the success among young and other adults, it is outstripped by that I have met with in children and infants. Out of thirteen so treated I know of no failure, and I am paying increased attention to the operation at these early periods of life."

He mentions one case of umbilical hernia that remained cured ten years after an operation, which consisted of a ligature "simply applied to the neck of the sac."

Coley, of New York, $^{814}_{\text{Apr.15,'94}}$ states that, "while mechanical methods will undoubtedly long continue to hold the leading place in the management of hernia, a careful and unprejudiced study of the results of such methods of treatment will tend more and more to the extension of operative methods to judiciously-selected cases."

T. S. K. Morton $^{9}_{\text{Apr.28,'94}}$ discusses the propriety of castration in operations for the radical cure of hernia, and reports three cases in which he had adopted this plan. He would limit it to (1) certain cases of undescended testis; (2) some cases of congenital hernia; (3) certain cases of chronic or acute disease of the cord or testis; (4) rare cases where severe traumatism has occurred to testis or cord; (5) certain cases where sloughing of the sac has involved the cord and testis; (6) hernia in very aged persons.

Strangulated Hernia.—Ljunggren $^{996}_{\text{Mar.10,'94}}$ has made a bacteriological study of 9 cases of strangulated hernia. In 6 cases no bacteria had apparently traversed the intestinal wall. In 3 bacteria were found in the fluids of the hernial sac. In the 6 cases

in which no bacteria were found, strangulation had existed 8, 18, 24, 30, 40, and 132 hours, respectively. In 1 case the intestine had undergone marked alteration. The conclusions of the author are that in non-gangrenous hernia bacteria are seldom found in the fluid. The intestines may undergo very grave changes and still be impervious to bacteria. Of 39 cases investigated by others, the hernial liquid was free from micro-organisms in 27 cases.

The treatment of strangulated hernia is discussed at considerable length by Jonathan Hutchinson, of London, $^{806}_{\text{Jan.,'94}}$ who argues against the modern trend of surgical opinion in favor of early operations and attempts to prove, by numerous statistics of various London hospitals, that prolonged taxis is practically without risk and does not prejudice the chances of the patient if operation be necessary. At the London Hospital in the years 1885 to 1889 there were 100 operations for strangulated hernia, the mortality of which was 50 per cent. With these figures he compares 67 cases of hernia that could not be "reduced at home," admitted to the London Hospital in the year 1864; 5 of these were reduced in the receiving-room and returned home; 24 of the remainder were operated upon, 11 dying. The real fatality of strangulated hernia during that year was then 16 per cent. From 1842 to 1847, 293 patients were admitted to the London Hospital with strangulated hernia. In 206 of them taxis was successful and, so far as was known, not a single patient died. Hutchinson doubts that fatalities follow forcible and prolonged taxis, having never seen an instance in his own experience.

John Ashhurst, Jr., $^{451}_{\text{July,'94}}$ reports 19 cases of strangulated hernia treated by operation; of these, 14 were inguinal and 4 femoral. Of 13 cases of inguinal 10 recovered and 3 died; the result in 1 case was not known. Of the femoral cases 3 recovered and 1 died. In 3 of the fatal cases the bowel was gangrenous. In 1, where strangulation had existed for thirty hours and the patient had previously been subjected to prolonged and forcible taxis, operation showed that the bowel had been ruptured in two places and that twelve inches were gangrenous; circular enterorrhaphy was performed, but the patient died at the end of thirty-two hours. The youngest patient was 2 years old and recovered; the oldest was a woman of 80 years, with umbilical hernia, who died from peritonitis. These cases are of interest, inasmuch as

they contain at least one example of the danger of severe and prolonged taxis.

Tariel, of Paris, [118 May,'94] contributes a valuable paper on strangulated inguinal hernia in the infant, always considered exceedingly rare. Many of the most noted surgeons have never seen a single case. The author mentions Gosselin, Holmes, St. Germain, and Lannelongue as never having had occasion to operate in this class of cases. Felizet noted only 4 cases of strangulation in 105 cases operated upon, and Broca only 9 in 200 operations for radical cure in infants. Marsh collected 47 cases in 1874, and Féré [91 '81] 57 cases in infants under 2 years of age.

Tariel, up to the present time, has been able to gather 128 cases. He concludes that strangulation in infants is not rare, but that it is almost impossible to determine the relative frequency as to the cause of the strangulation; Marsh states it to be the neck of the sac in 20 cases out of 32, the external ring in 7, the internal ring in 3, both rings in 1 case, and the conjoined tendon in 1. Tariel found the neck of the sac the cause of the constriction in 58 out of 81 cases; the sac nearly always contained small intestine, but in 8 cases the cæcum and appendix were found, in 3 cases the appendix and small intestine, in 2 cases the tube, and in 1 the tube and ovary. Of the 128 cases collected by the author 74 were cured; the sac was opened ninety times. These cases, according to the author, should be operated upon, and the earlier the better, both as regards saving of life and radical cure. The technique does not differ from that employed in adult cases. The sac should always be opened and an attempt made at radical cure if the condition of the patient permit.

Stern [96 Sept.,'94] gives some very interesting and valuable data in regard to strangulated hernia in infancy and early childhood, reporting two cases from his own practice. In order to determine its frequency, Stern consulted the records of the children's hospitals in Basle, Prague, Breslau, Vienna, Krakow, Frankfort, Amsterdam, Berne, and Göttingen. In these hospitals, during the four years preceding 1883, 139,000 children were treated, yet in the entire number not a single child was operated upon for strangulated hernia. Of 1900 herniotomies performed in various European hospitals 13 were in children for incarcerated hernia. Stern concludes that 108 adults are operated upon for strangulated

hernia to 1 child. König states that in a long surgical career he has operated upon but 2 such cases. Stern has collected 51 additional cases, which, added to the 87 cases previously collected by Knobloch, make a total of 138. Knobloch found 11 cases of umbilical and femoral. Stern found 3 additional cases of umbilical hernia. Fifty-nine of Knobloch's cases occurred during the first year of life. In 11 of the 51 cases the sac contained the cæcum and appendix; but 4 cases occurred during the third and fourth years. In 2 cases the results of operation were not known; of the remaining 49 11 died, or 22.6 per cent; of Knobloch's 87 cases 27 died, or 31.03 per cent. Stern's cases occurred between 1876 and 1893; 59 of Knobloch's cases occurred before 1874, with a mortality of $33\frac{1}{3}$ per cent. The total mortality during the antiseptic period in 75 cases was 21.3 per cent. In the 14 umbilical cases the mortality was 50 per cent.

[I have operated upon 6 cases of strangulation in children under 2 years of age,—5 in infants under 1 year. Only 1 death occurred, and that in a child, 8 weeks old, that was practically moribund at the time of the operation. In all of the other cases radical cure was attempted, and none of the cases have since relapsed. In 2 cases the cæcum and appendix were found in the sac.—W. B. C.]

Chaput $\frac{366}{\text{May,'94}}$ reports a case in which he resected twenty centimetres of intestine by the method of circular enterorrhaphy, followed by recovery. Cocaine alone was used to produce anæsthesia. His conclusions are that the method of immediate resection and suture is superior to that of making an artificial anus, and he contrasts the mortality of 15 to 20 per cent. attending resection with 80 to 90 per cent. following artificial anus. Resection and suture are contraindicated when collapse is present.

F. T. Paul, of Liverpool, $\frac{2}{\text{Feb.3,'94}}$ reports a successful application of his method of bowel-invagination with a bone tube, where, owing to the swelling, it was found necessary to invaginate the lower into the upper bowel. The patient was a woman of 51, and the cause of enterectomy was a strangulated femoral hernia. The author calls attention to the fact that this method is recommended only in cases of involvement of the small intestine.

Gussenbauer $\frac{336}{\text{Jan.,'94}}$; $\frac{61}{\text{Feb.24,'94}}$ has tried Finkelstein's method of using ether in strangulated hernia in a number of cases at the Prague

Clinic. Of 135 cases 108 required operative interference, and in only 5 of these was the ether treatment unsuccessful. The hernia was reduced in from one to three hours, and but 2 cases required longer than three hours.

Prior [51 July,'94] reports a case of strangulated hernia in an infant 7 weeks old. Recovery followed operation.

Rare Forms.—Gay, of Boston, [99 Dec.28,'93] reports a very rare case of what he has termed "compound" hernia. The patient, aged 37 years, had been operated upon in 1878 for strangulated hernia. Eleven years later (1889) an operation was performed with the hope of curing the relapse that followed the first operation, but without success. In April, 1893, he entered the Boston City Hospital with the history that, twenty-four hours previously, while lifting a weight, the cicatricial tissue over his hernia had given way, permitting a portion of the small intestine to escape. This remained without any treatment, still protruding for twenty-four hours. The bowel was found distended and covered with a thick layer of dirty-grayish lymph. Operation was performed and the patient made a good recovery. Gould [22 June 20,'94] reports a case of strangulated hernia through the abdominal wall. The opening was in or near the linea semilunaris and some distance above the inguinal canal.

Demons and Binaud [96 Aug.,'94] report a case of omphalo-properitoneal hernia,—the fourth on record. The patient, aged 62 years, had a strangulated umbilical hernia. Operation showed a sac proper containing a loop of strangulated gut and omentum and, communicating with this sac, a second sac six centimetres long lying below the umbilical ring and between the peritoneum and abdominal wall. This second sac contained omentum. Both sacs were dissected out and the patient made a good recovery. Terrier was the first to recognize this condition and reported a case in 1881.

Rose [6 July 28,'94] reports a case of inguinal hernia associated with hernia of the bladder. This rare form is usually found in the scrotal hernia of old men. Macready collected 36 cases, of which 26 were scrotal, 4 labial, 2 femoral, 1 vaginal, 1 perineal, 1 ischiatic, and 1 ventral. There is usually more pain in vesical hernia. Rose's case was a young woman, 24 years old, in whom hernia had existed three years, and was reducible. Micturition was

often painful and sometimes not performed for from twenty-four to thirty-six hours. During these times the swelling was apparently larger. The bladder was opened during the operation, but quickly sutured with fine catgut, the case making a satisfactory recovery.

Guérin [188 Jan.14,'94] reports a case of left inguinal hernia containing the cæcum, in a man aged 64 years. It was found so adherent at the time of operation that it was resected. Recovery followed in due time.

Finney, of Johns Hopkins Hospital, [764 Oct.,'93] describes a case of multiple hernia, in a child aged 21 months,—double inguinal and umbilical, all voluminous. The operations were done in three sittings, with very satisfactory results. Boodle [267 July 15,'94] reports a case of strangulated hernia of the cæcum in an infant 6 weeks old. Strangulation had existed two days, and the abdomen was greatly distended. Operation was performed and uninterrupted recovery followed.

Koslowski [5 Aug.,'94] reports a case of echinococcus found in a portion of irreducible omentum. Smith, of Sydney, [267 July 15,'94] reports a case of hydatid cyst of the hernial sac, in a patient 85 years old. There was no evidence of hydatid trouble in any other part of the body. The cyst was about three-fourths of an inch in diameter and free in the hernial sac. This case is believed by the author to be unique.

Starr, of Toronto, [39 July,'94] reports a case of lumbar hernia about the size of a duck's egg, appearing through the triangle of Petit. The patient was an adult, and the hernia was caused by heavy lifting.

Faguet [70 Aug.12,'94] reports two cases of tuberculous hernia. This form or, rather, this change in the contents of a hernia is very rare, having been first noticed by Baron in 1818. Faguet's two cases were briefly as follow: Primary localized tuberculosis of the hernial sac in a left inguinal enterocele. Operation for radical cure was performed, but generalized tuberculosis followed, proving fatal in six months.

W. L. Rodman, of Louisville, [224 Nov.21,'93] reports a case of abscess of the omental stump following operation for irreducible inguinal hernia. There was no trouble until the thirteenth day, when a swelling appeared in the right iliac region, increasing in size until

it was as large as a "doubled fist," when it broke externally. The case ended in recovery. Bull, of New York, has reported several cases of a similar nature.

Delanglade [7 No.12,'94] reports several very interesting cases of cysts of the round ligament and of the canal of Nuck, associated with inguinal hernia.

DISEASES OF THE RECTUM AND ANUS.

By CHARLES B. KELSEY, M.D.,
NEW YORK.

RECTAL STRICTURE.

Mouchet [360 Nov.,Dec.,'93] contributes a careful clinical and microscopical study of the so-called syphilitic stricture of the rectum, under the name of hypertrophic, proliferating, and contracting rectitis. The patient who serves for a text is, as usual, a woman, and the disease has existed for six years. The symptoms are the invariable ones of difficult and bloody stools, the escape of mucus from the anus, loss of power over the sphincters, long periods of constipation, and misshapen fæces. At intervals there are severe attacks of diarrhœa, caused by the efforts of nature to clear the bowel of its retained fæcal matter.

"When rectal touch is practiced the index finger encounters, just within the sphincters, a mass of irregular vegetations, which might easily be mistaken for malignant disease. They are, however, independent one of the other, and, instead of resting, as would be the case in cancer, upon a tumor which serves as a common base for all of them, they are implanted directly upon the mucous membrane, which, by the touch, will be found to have preserved its suppleness and normal mobility.

"If, after having made these first observations, the finger is carried farther into the canal, the sensations totally change. A rigid canal is reached, with resisting walls, which contract like a cone, in such a way that the upper part will not admit the passage of the end of the finger. This last part is irregularly fluted, the mucous membrane is smooth and movable; in brief, all the signs of the so-called syphilitic stricture of the rectum are met with. The rectum is movable throughout, and careful examination of the pelvis and iliac fossæ shows no enlargement of the ganglia. Vaginal examination allows the hard and fibrous mass within the rectum to be felt, but the vaginal wall is independent of it, and there is nothing abnormal about the genital organs.

"The patient has not noticed that she has lost flesh for some time, although somewhat more feeble than formerly. She is, however, sufficiently pale and thin. All of the viscera are normal. There is no hereditary history, and the most careful examination, both physical and oral, fails to bring out anything which might resemble syphilis in skin, bones, or lymphatic system. From the local examination, the duration of the disease, and the integrity of the general condition, the idea of malignancy is abandoned, and the diagnosis of proliferating rectitis with contraction is made and surgical intervention proposed.

"A modification of Kraske's operation is performed. The gut, after being isolated through a posterior median incision, is divided longitudinally over the extent of the disease, then transversely just above the sphincters, and again above the stricture. The upper end of the gut, being perfectly movable, is brought down and stitched to the sphincters. In front, a careful approximation is made of the perirectal tissues with catgut, and the rectum itself is sutured. Behind, the order of suturing is reversed, the gut being first united and subsequently the perirectal tissues. The incision through the sphincters in the posterior median line is carefully closed by deep sutures, and finally the skin is completely closed without drainage. On the fifth day fetid pus is found escaping through the incision, the wound is opened up, and the intestinal suture is found to have given way along the posterior third; but the patient makes a good recovery. The vast cavity of the wound closes gradually by granulation, and after several weeks cicatrization is almost complete."

To this practical point of treatment the editor will return after following the author through his careful and important microscopical and clinical study of the case.

"What sort of lesion is this that has been described? What is the nature of the retraction, and what relation may there be between the retraction and the vegetations which exist below it?

"Above the sphincteric ring there exists a part not strictured, covered with papillomatous vegetations; above this commences a canal, rigid, inextensible, and more and more contracted as it ascends. The mucous membrane is smooth over all this portion except at one point, where a slight ulceration is noticed. The contraction ends abruptly above, and the mucous membrane

takes again its normal aspect, having sloughed at one small point. On section it can be seen with the eye that the mucous membrane is completely adherent to the subjacent tissue, which is white and hard, the section being dry. Below this fibrous ring, which measures about one centimetre in thickness, the muscular layer can be seen.

"The results of microscopical examination are much more interesting. At the first glance one is struck by a certain number of salient facts: the glands have completely disappeared; the irregular, papillary projections penetrate the thickened and hardened epithelium, which rests directly on the subjacent connective tissue, it being impossible to distinguish what appertains to the chorion of the mucosa or to the cellular layer.

"Studying in detail these modifications we find that the epithelium is modified; from cylindrical it has become stratified pavement, and has taken the Malpighian type. In the deeper parts there is seen a process of keratinization, and in general a thickened layer, completely hardened, where the cellular contours have disappeared. At some points the mucous membrane is adherent. The epithelium rests directly on the subjacent fibrous tissue. There are neither muscularis mucosæ nor glands. Between the epithelium and the muscular layer, dense, fibrous bundles are seen, heavily charged with embryonal cells. At certain points these fibrous bundles appear gathered around the blood-vessels. Embryonic cells, strongly colored by the reagents, exist in abundant masses in the lymphatic spaces which separate the fibrous bundles and around nearly all of the blood-vessels, which are, moreover, rare in the fibrous thickening and only capillary, their endothelium being tumefied, the nuclei of the endothelial cells very marked and brightly colored by reagents. The embryonic cells which surround these vessels are at some points difficult to distinguish from the white blood-corpuscles in their interior. At no point is there a proliferation of the deep epithelium resembling epithelioma.

"In the peripheral portion the unstriped muscular fibres show no changes, but the vessels in this layer or beyond are altered and the endothelium of the arteries is somewhat proliferated. Both arteries and veins are surrounded by considerable embryonic masses.

"From the microscopical examination the case is shown to be

an inflammatory affection, characterized by a perivascular sclerosis with complete disappearance of the glands of the mucous membrane and transformation of the type of epithelium. It is not to be doubted that we have to do with the variety of stricture known as syphilitic; its clinical characters, evolution, seat, conical form, and the persistence of the mucous membrane leave no doubt on this point. The vegetations which occupy the subjacent part of the rectum do not incline us to reject this diagnosis, rather the contrary. They are not very rare, and many cases of them have been recorded."

The editor would merely call attention to the fact, which may not be plain to all, that the author is describing a case of two distinct diseases in no way related to each other. The non-malignant papillomatous growths below the stricture have nothing to do with the stricture itself. It would, perhaps, have been clearer to the student had a case been selected for this study in which stricture alone existed without any other pathological changes.

It now remains to know if this stricture, characterized as syphilitic, is in reality syphilitic. How can the rôle of syphilis in the causation of these strictures be explained?

After quoting the usual authorities for considering this form of disease as syphilitic (Gosselin, Desprès, Trélat and Delens, and Verneuil), the argument against it is entered upon. Duplay has already noted $\frac{3}{\text{Nov.23,'92}}$ one clinical objection to the theory of syphilis. He calls attention to the fact that it is impossible to find any trace of syphilis in a great many of the patients suffering from this so-called syphilitic stricture of the rectum. Moreover, how is it possible to explain the inefficiency of specific treatment by mercury and iodide of potash in large doses in the presence of ano-rectal syphiloma, while the treatment succeeds so marvelously in other tertiary lesions? It is true that Trélat claimed to have obtained a notable amelioration in several cases by antisyphilitic treatment, but the relief has always been of short duration and has not rendered more energetic treatment unnecessary in the end. Generally specific treatment fails, and to explain the failure it is customary to say that the period of infection is too remote from its trial, that sclerosis of the rectum has already been established, and that specific treatment is powerless against sclerosis. How-

ever, "at one time or another some cases should present themselves in the initial stage of ano-rectal syphiloma in whom, consequently, specific treatment should succeed."

In short, the failure of specific treatment and the absence of any other trace of syphilis in a great number of the patients are the two well-known clinical objections against the syphilitic character of the contraction. To the clinical arguments the author adds another from pathological anatomy.

Berger, reviewing the histological study made by Malassez of a so-called syphilitic stricture, concludes that if these strictures are to be included among the manifestations of syphilis, it cannot be because of their pathological anatomy. This is their structure, according to Malassez: "At the middle of the contraction the thickening of the mucous membrane is made up by a material of indifferent structure, vaguely fibrillary, in the centre of which there is found an accumulation of nucleated cells and free nuclei, analogous to those found in all connective-tissue proliferations. Below, as the base of the ulceration, there are observed the traces of a chronic inflammation of the submucous connective tissue,—that is, a connective-tissue hyperplasia characterized by the presence of an abundance of embryonic elements in the middle of an amorphous matter." Berger adds: "These lesions are those of all ulcerations and all strictures, whatever may be their nature; there is nothing characteristic in them."

Girode has made a very complete study of a stricture removed by Quénu from a woman manifestly syphilitic: "The cellular layer," he says, "tends throughout to assume the character of epidermis. The granular stratum is throughout strongly marked; showing six or eight layers of superimposed cells. The Malpighian layer is thickened, and the interpapillary projections appear elongated and swollen. The basement-cells are generally better marked and strongly pigmented. A certain number of Malpighian cells have become totally vacuolar. Again, there exist, in some of the interpapillary prolongations, elements which singularly resemble psorospermic formations.

"In the skin the alterations take on much greater importance. The dermic layer is considerably thickened, owing to the presence of embryonic infiltrations which have completely altered the structure of the part. The infiltration is not diffuse, except at some

points in the subpapillary layer, where the connective tissue has completely disappeared. More deeply the embryonic masses are disposed in islets around the vessels, glands, and the nerves themselves. The arteries especially appear to be completely surrounded by an embryonic layer, but their walls remain intact in the two internal layers, and their calibre is free. The glands have almost totally disappeared, imbedded in the same formations, and only vestiges of them remain. Some bloody extravasations and large fibrous tracts are to be noted in the derma, appearing to attach themselves by preference to the papillæ, and without doubt causing the nodulation of the neoplasm. All these embryonic masses are composed of cells of the lymphatic type, rounded or a little irregular, and in active proliferation."

This examination corresponds closely with that of the author, and the question is: Have we a lesion which can properly be attributed to syphilis? It is only necessary to consider the late manifestations of syphilis. In all really syphilitic patients it is always at a period very remote from the chancre that the stricture appears. The latter is then of the general nature of a gumma. Now, by what do we recognize a gumma? All authors are in accord on this point: It is by the disposition of nodules the centres of which necrose. Cornil and Ranvier state: "When one examines microscopically a fine section of a gumma in process of evolution, one finds a series of nodules, each possessing a centre of formation. These nodules, more or less marked in form and limits, have this in common: that the cellular elements of the central portions are small and fall into molecular detritus, while those of the periphery are voluminous, round or fusiform, and confounded with the adjacent tissues. The blood-vessels penetrate to the periphery of each nodule, and may even reach their centres and ramify there."

No one has reported any such disposition in the so-called syphilitic strictures. No one has remarked this central degeneration of the embryonic nucleus. Girode has not noticed it; it did not exist in the author's case; on the contrary, the vessels, instead of penetrating to the periphery of the nodules, generally occupied the centre. In none of the syphilitic strictures so far studied have the elementary lesions characteristic of syphilis been noted. This is not the opinion of Gauran, who believes he has found, by early histological examination, lesions sufficiently marked to constitute a

proof of the syphilitic nature of the disease. Not to quote his report in full, he himself says: "It is true that it is impossible to find any indications of the degeneration which is usually relied upon as indicative of gummata."

The author does not admit that the abundant proliferation of embryonic cells, which characterize the stricture according to the examination of Gauran, is an indication of its syphilitic nature, since the characteristic sign, the cellular degeneration of the centre of the nodules, is absent. Nor does he admit that the gumma, having finished its evolution, has become a cicatrix, and that it is with this we have to deal; for the reason that the cicatrix of a gumma never produces a veritable tumor. Always and everywhere, whether the gumma is eliminated or absorbed, the process of cure is attended by atrophy of the organ.

Certain authors admit, it is true, that there exist other syphilitic neoplasms besides gummata. But here all is obscure and uncertain. Discussion is useless and histology gives no assistance, because we recognize, as did Cornil and Ranvier, that "in many of these neoplasms no anatomical difference can be found between them and simple inflammations."

Leaving now for a time the question of histology, we will consider that of general pathology. Where, or in what organ, are truly-syphilitic lesions found at all comparable to those seen in stricture of the rectum? Is it in the urethra, the œsophagus, or in the air-passages? Undoubtedly, syphilis causes stricture of the larynx and of the trachea, perhaps even it may do the same in the œsophagus, but these constrictions are due to the cicatrization of lesions primarily ulcerative; they are irregular cicatrices, salient bands which deform the organ, and they in no way resemble the regular conical stricture of the rectum. Are we forced, then, to admit that this variety of stricture is a lesion unique in the history of syphilis? That would indeed be very singular.

Although nothing is found in the history of syphilis that at all corresponds with stricture of the rectum, there are lesions of other varieties which closely resemble it anatomically and clinically; and the author is led to the conclusion that the so-called syphilitic stricture is the result of a simple proctitis arising from any one of many irritating causes.

Returning now to the practical question of surgical treatment (and there is no other of any value), there is much to be said. In the author's case, after careful suturing of the ends of the gut and the surrounding tissues which had been divided in the operation of excision, it was found in a few days that the attempt to get union by first intention had failed, that foul pus was escaping from the cutaneous incision, and that the sutures in the posterior wall of the gut had torn out. A large, foul wound was the natural consequence, and a slow recovery with a fæcal fistula. The objections to this method of treatment could not be more concisely stated. For, unfortunately, the sutures often will tear out, the wound will become fouled, and not infrequently the patient's life will be lost.

The explanation, to the mind of the editor, is to be found in the simple fact that the ends of the gut where sutured have no peritoneal covering to assist in rapid union.

Nor are the results any better with the Murphy button, the safety and beauty of which are due in great measure to the presence of the peritoneal coat at the points where it is generally applied. In the rectum it will sometimes be found lying loose in the wound in a very few days.

Another cause of the failure to get union by first intention in the cases of more extensive disease is that it is often necessary, in order to bring the upper end down to the anus, to strip up the mesorectum for a considerable extent. In this way, again, the nutrition of the upper segment is seriously interfered with, and sloughing after suturing is not at all uncommon.

Failure to get union of the ends of the gut when they have been sutured turns what would otherwise be a safe and beautiful operation into one of high mortality. Many a patient will seem on the point of recovery till fæcal matter once escapes, who will sink from prolonged fever and suppuration after it has occurred.

Extirpation is certainly, as the author says, the ideal treatment for these and all other non-malignant strictures, but we are as yet far from realizing the ideal. Extirpation of non-malignant stricture is no less fatal than the same operation done for cancer, and the mortality is not less than 15 per cent. Bearing in mind that these strictures, although they render a patient very miserable, are still seldom fatal, and that, by mild measures, such as

proctotomy and dilatation, life may be rendered very comfortable. Such a rate of mortality is a great obstacle to all attempts at radical cure by excision and suture.

A safer operation than excision with suture is excision without attempting suture, the upper end of the gut being brought out behind and the new anus formed at the point formerly occupied by the coccyx. But here the mortality is very much greater than in colotomy, and there is no compensating advantage. Experience has, I think, proved that, if an artificial anus is to result at all, the most convenient place for it is in the left groin.

Of course, in the removal of cancer all things are secondary to the main result; but in the treatment of non-malignant stricture there is much room for question whether a woman, whose stricture has been excised at a considerable risk, and who finally recovers either with an anus in the natural place and another one just above it (called, for euphony, a fæcal fistula), both of which discharge fæces, or with one large opening at the point where the lower sacral vertebræ have been removed, is any better off than she would have been after a comparatively safe colotomy.

All talk of fæcal control after these operations means, simply, that when diarrhœa is not present the patients are pretty comfortable, and the same thing is true of colotomy.

I simply note these practical objections to the operation of excision for non-malignant stricture, in the hope that they may be useful to the reader. Excision is the ideal treatment, but its success depends upon getting union of the divided ends, and any improvement in technique which will insure this result is the point to which practical effort should be turned.

The Murphy button does not give as good results here, or at least has not thus far in the editor's practice, as close and careful suturing, tedious and difficult though it be.

The objections which any operator of much experience will be forced to admit are as yet inseparable from all the operations for excision of strictures of the rectum are leading to much ingenuity in modifying the operations and to many variations in the technique.

Hartmann [2091 '93] advocates the following procedure, which has once met with success in his hands:—

After having dilated the anus with the speculum of Nicaise

we can see the stricture, which presents itself like a diaphragm, contrasting, by its rigid appearance and grayish color, with the velvety mucous membrane of the anal region. It is seized with a pair of forceps of Richolet, and by gentle tractions brought down to the neighborhood of the skin, being invaginated, so to speak, in the anal canal. The layers of the rectum are then divided at the circumference of the stricture thus pulled down, and this can be done without bleeding, the pulling down of the stricture and bending of the vessels sufficing for hæmostasis. Then, with the finger, the stricture is separated from the adjacent parts exactly as is done with the uterus in the second stage of vaginal hysterectomy, the scissors and bistoury being used only when necessary at points of great resistance. This is continued till a point has been reached above the level of the stricture. Then the rectum is cut across, and there will be some bleeding. Forceps are placed on the bleeding-points, and these serve still farther to invaginate the end of the rectum into the anal cylinder, which has been preserved. By the aid of some stitches of silk, which include in their loops the entire thickness of the rectal wall and are tied after having passed through the skin of the margin of the anus, we secure hæmostasis and at the same time prevent the re-ascent of the superior extremity. Placing a large drain in the rectum, protecting the line of suture by tampons of iodoform gauze, the whole is covered with gauze-cotton and a bandage.

The operation includes three distinct stages:—

1. Dilatation of the anus. There is nothing peculiar in this except that the author believes that methodical dilatation with the speculum of Nicaise is better than stretching with the fingers, inasmuch as it permits a good view of the stricture by keeping the instrument open.

2. Pulling down and isolating the stricture. The stricture, having been seized with traction-forceps identical with those used in fixing and pulling down the uterus, is pulled down and the rectum is divided circularly around it, exactly as is the vaginal mucous membrane around the neck in vaginal hysterectomy. Nothing is then easier than to separate the surrounding parts from the stricture, which permits of its being pulled still lower down the more the liberation is continued. This pulling down, in the absence of perirectal adhesions, is easy. This is proved

clinically, and anatomy explains it by showing that the rectum, firmly fixed at its termination by the sphincter, the coccyperineal raphé, the levators, the so-called lateral aponeuroses of the prostate or utero-sacral ligaments (better called sacro-recto-genital aponeurosis, Delbet), is only held above these parts by the superior hæmorrhoidal vessels.

3. Section of the rectum and fixation to the skin of the superior invaginated portion. At the moment of the section of the rectal wall above the stricture it is necessary to seize the rectal wall at the bleeding-points with forceps. This secures hæmostasis and prevents the ascending of the upper extremity. The sutures used for attaching the upper end to the verge of the anus prevent hæmorrhage as well as hold the gut in place.

At the end of a few days, the sutures having cut through the rectal wall, it will ascend spontaneously without, however, going too far, the adhesions which have occurred during its fixation sufficing to maintain it in good position. This is, moreover, a point well established by the operations of Hochenegg, Kraske, and Richolet, who, after resection of the rectum by the sacral method, have abandoned the suture of the two ends (a suture long, difficult, and often exposing the patient to fæcal fistula), substituting for it the rapid and excellent fixation of the upper end invaginated into the lower.

By its rapidity, simplicity, and the slight injury which it causes, this procedure seems preferable to the others in suitable cases. These, the author believes, are the cases of annular stricture of the rectum, whatever their cause, provided the strictures are movable and are not so high but that they can easily be reached and pulled down.

The following is abstracted from an article by Bacon, of Chicago, $\frac{1150}{\text{Jan.,'94}}$ without comment. He has "come to the conclusion that the only rational method for curing this troublesome class of cases would be by forming a new channel around the stricture by folding the gut immediately above the constricted portion of the bowel down over the stricture and anastomosing it with the rectum just below the narrowed part of the gut, then at a subsequent operation clamp away the septum that has been formed by the union of the approximated surfaces of the folded piece of gut with the rectal wall (Fig. 1).

"By this means we are able to perform a complete severing of the cicatricial stricture-band and keep it from reforming, because the healthy gut utilized in building a new channel around the stricture acts as a connecting-link between the two ends of the stricture-band that is severed by the clamp. The irritation is removed and the cicatricial mass is gradually absorbed.

"The anastomosing of the bowel above the stricture with the bowel below would in no case be of more than a temporary benefit, because the extensive amount of fibrinous connective tissue in the rectal wall would soon contract and cause fæcal impaction.

"The clamping away of the newly-formed septum (Fig. 3,

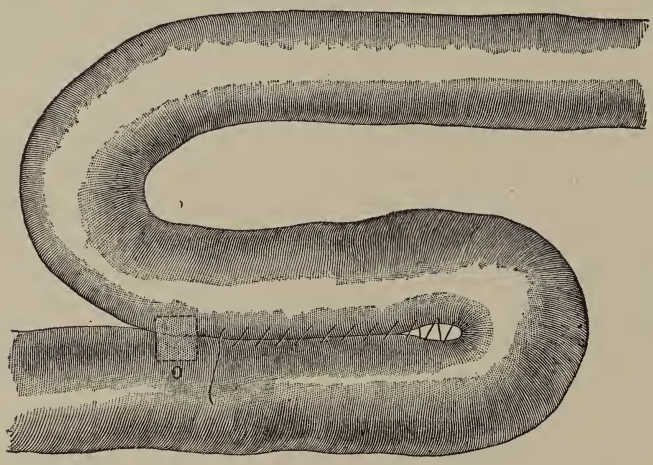


FIG. 1.—STRICTURE OF RECTUM. (BACON.)
Sigmoid anastomosed with rectum at *O*, and septum sutured.
Mathews's Medical Quarterly.

A to *B*) is the important part of the operation, for by this means the new channel is added to the calibre of the rectum (*E* to *D*, Fig. 3) and all fæcal obstruction is removed.

"As most rectal strictures involve the levator ani, one can readily see, from the anatomy of the parts, that the anastomosis could not be made by any device requiring sutures, and on this account I was unable to successfully carry out the practical part of the operation until I saw that ingenious device, the Murphy button. This operation is applicable to all strictures occurring between the internal sphincter and the upper part of the sigmoid.

"The operation is performed as follows for all cases where the stricture involves the levator ani or the gut above:—

"After complete anæsthesia the patient is placed in the extreme Trendelenburg posture, and a laparotomy is made in the median line from the pubis to the umbilicus. This incision will enable the operator to see the rectum and measure the extent of the contraction, and to decide how much of the sigmoid he must use to fold over the stricture and anastomose below. Hav-

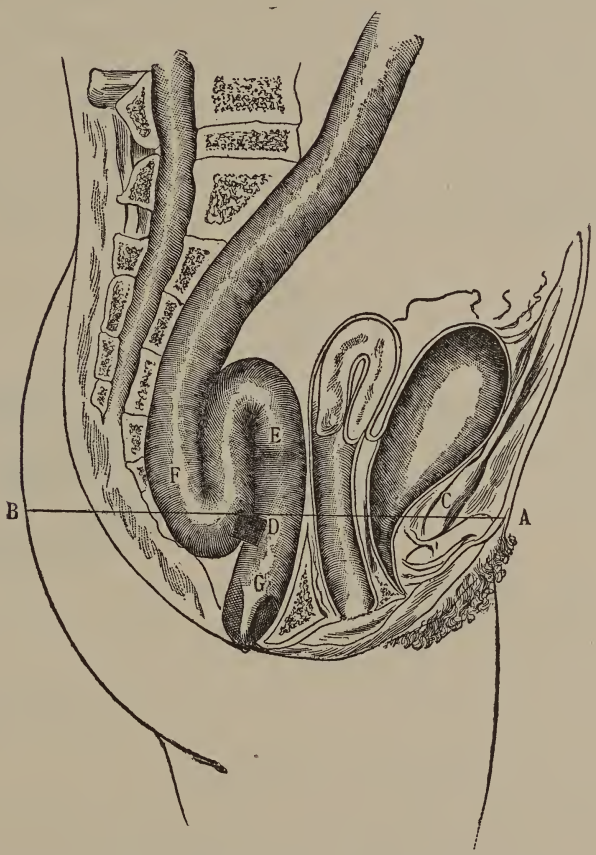


FIG. 2.—STRICTURE OF RECTUM. (BACON.)

Line *A* to *B* represents the lower limit of the levator ani; *D*, the anastomosis buttons in position after sacral section.

Mathews's Medical Quarterly.

ing determined the amount, the sigmoid is drawn well up into the abdominal wound, and an assistant places a small Murphy clamp above and below that point of the gut selected for the anastomosis button. An incision is now made into the gut and the male half of the button firmly secured in position in the usual way. This half of the button is now carefully held by an

assistant, while the operator scarifies the surfaces of the sigmoid and rectum that are to be held in apposition.

"The next step in the operation is to place the female half of the button in position just below the stricture, and is done as follows: An assistant takes the instrument (Fig. 4), places the female half of the button over the trocar-point, and inserts the button through the anus and up the rectum to the lower border of the stricture; keeping the point of the trocar guided anteriorly, he presses the neck of the button against the anterior rectal wall. The operator, by feeling down the pelvis through the abdominal incision, readily finds the point of the trocar, and, by pressing directly over it with a pair of dressing-forceps, the trocar perforates the rectal wall and carries the neck of the button with it.

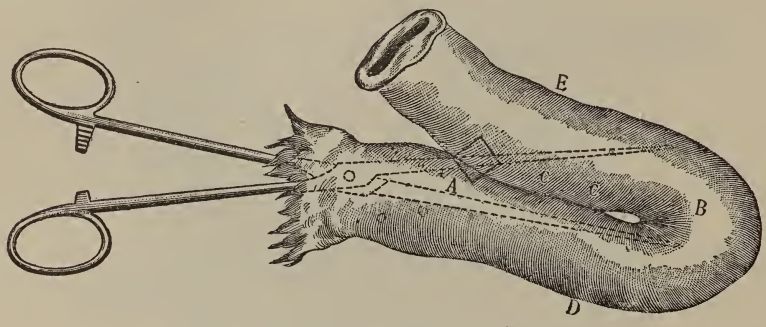


FIG. 3.—STRICTURE OF RECTUM. (BACON.)

Showing instrument in position for clamping away the septum, *A* to *B*; *C C*, sutures approximating the walls of the septum; *D*, strictured part of the rectum.

Mathews's Medical Quarterly.

This half of the button is now seized by the operator's left hand and, taking the male half in his right, the two halves are approximated and the anastomosis is complete.

"Two or more sutures are now put in the peritoneal layer of the gut at *C C* (Fig. 3), so as to hold the previously-scarified surfaces together and secure a firm union and form a septum (*A* to *B*, Fig. 3); also to prevent the possibility of a loop of small intestine getting between the approximated surfaces and endangering the life of the patient when the clamp is applied as in Fig. 3.

"The button will be expelled, as a rule, in from five to seven days, when an enema may be given and the rectum and colon thoroughly evacuated.

"A clamp is now inserted through the anus, one blade of which is introduced through the button-hole (*A*, Fig. 3) and the other blade through the stricture-opening (*D*, Fig. 3), and firmly clamped upon the septum (*A* to *B*, Fig. 3). Each succeeding day the handles of the clamp are pressed together one or two notches until the septum is completely severed, usually by the third day. The calibre of the rectum will now be increased by the addition of the extra channel as represented (*E* to *D*, Fig. 3).

"In cases where the rectal stricture extends down almost to the internal sphincter the operation may be done by the sacral method.

"Where the sigmoid mesentery is normal in length, strictures of the sigmoid may be treated by the same operation as for stricture of the rectum.

"I performed this operation upon four dogs a year ago. Two were done by laparotomy and two by sacral section. All four

FIG. 4.—STRICTURE OF THE RECTUM (BACON.)
Instrument for inserting the female half of the button.
Mathews's Medical Quarterly.

were operated on by the clamp afterward, and made excellent recoveries with perfect results. Since then I have, with the assistance of Murphy and Lee, of this city, performed the operation successfully upon one case,—a woman with an old specific stricture."

COLOTOMY AND EXTIRPATION.

The fifth annual report of the clinic for diseases of the rectum at the New York Post-Graduate Hospital $\frac{1}{\text{Dec.16,'93}}$ is chiefly devoted to a study of 99 strictures and cancers of the rectum; 40 colotomies and 23 extirpations have been performed, with 3 deaths after the former operation and 7 after the latter.

After a study of the pathology of the so-called syphilitic stricture, the technique of the operation of resection and the results as to life and comfort are briefly considered.

H. O. Marcy, of Boston, $\frac{99}{\text{Dec.7,'93}}$ removed, by a modified Kraske incision, four inches of carcinomatous rectum from a man, 46 years

of age, in fairly good health. The peritoneum was freely exposed and the mesorectum divided as far as necessary. The lower incision was two inches above the anus. After the insertion of the button the peritoneal cavity was closed by suture and an additional continuous suture inserted around the anastomosis. The wound was partially closed. The button was not quite free on the twelfth day, but it was removed because its pressure upon the bladder was irritating. The patient was last seen twenty days after the operation, and the wound at that time was not entirely closed and a small fistula persisted posteriorly.

Zancarol, of Alexandria, [164 Nov.8,'94] reports three cases of cancer of the rectum treated by Kraske's method, all recovering after considerable suppuration, with normal function of the anus, which the author attributes to the fact that some muscular fibres were allowed to remain, and that they were cut parallel to the axis of the rectum. In the discussion of his paper before the Société de Chirurgie of Paris, Quénu expressed the opinion that, if curetting and cauterization of the growth were performed before the operation, suppuration would be less liable to occur. Intestinal antisepsis was not sufficient to insure asepsis of the wound. He attributed the continence established after Kraske's operation to the formation of a sphincter by the intestinal fibres. Routier did not agree with Quénu as to the measures for preventing suppuration, which he believed to occur on account of the impossibility of compressing the soft parts. Richer adduced, as another cause, the fact that the mesorectum is cut in order to draw down the superior end, the lower extremity of which is consequently badly nourished, causing sphacelus.

Moulonguet, of Amiens, [14 Oct.7,'94] relates two cases of extirpation of the rectum by a method which avoids the necessity of suturing the two ends of the intestine,—a stage of Kraske's operation which is often very difficult. Osseous resection is performed in the same manner as by Kraske's method; the anus is dissected, as well as the inferior portion of the rectum, avoiding the fibres of the anal sphincter. The dissection is continued by the sacrum until the upper limit of the diseased portion is reached, where the intestine is cut and its upper end brought down to the sphincter orifice, where it is sutured to the already freshened surface of the anus. The perineo-sacral wound is then united.

SURGICAL DISEASES OF THE GENITO-URINARY APPARATUS IN THE MALE.

By E. L. KEYES, M.D.,

AND

EUGENE FULLER, M.D.,

NEW YORK.

The Reflux, Under Certain Conditions, of the Vesical Contents into the Ureters.—Lewin and Goldschmidt, [20 B.134,H.33,'93] have made many interesting and original experiments which prove that, under certain conditions, the contents of the bladder flow back along the ureters. They experimented on guinea-pigs, injecting from 10 to 80 cubic centimetres (2½ fluidrachms to 2½ fluidounces) of colored liquid or milk and of air in unmeasured quantities. Out of eighty-two experiments the reflux was observed in forty instances, the fluid injected often penetrating into the kidney-pelvis. In these experiments it was seen that the reflux did not depend simply on the amount of existing vesical distension produced by injecting fluids into the bladder under pressure, but on the state of the orifices of the ureters; that is, on whether they were open or closed. Thus, at times it was found that, although a bladder had been greatly distended, yet no reflux had taken place, and *vice versâ*. From these results the authors argued that, in contra-distinction to the well-known peristaltic ureteral contractions, there also existed antiperistaltic movements which allowed of the back flow of the fluids from the bladder. Attention is drawn to the importance of this discovery from the stand-point of ascending infection.

Courtade and Guyon [266 Aug.,'94] have also made numerous experiments on dogs as well as guinea-pigs which confirm those of Lewin and Goldschmidt. In each instance a gum-elastic catheter was introduced and a ligature passed around the penis, thus preventing any fluid from passing out along the urethra and the sides of the catheter. A T-shaped end was then fitted to the extremity of the catheter, one arm of the T containing a mercury manometer, the vesical injections being made into the other arm. Water, colored

by methyl-blue, was the medium employed. These experiments showed that if fluids were injected slowly into an atonic bladder,—that is, into one whose walls offered no muscular resistance to the fluid distension,—the viscus might be so distended as to be ruptured without any reflux taking place. On the other hand, if there were vesical tonus, and if the fluid were injected quickly into the bladder, a reflux occurred in guinea-pigs in every instance, the minimum pressure required, as registered by the manometer, being from $1\frac{1}{2}$ to 2 cubic centimetres of mercury. With dogs, however, similar results, though obtained, were not so uniform, there being a reflux only five times out of twenty-five cases, and in those instances a pressure of 5 or 6 cubic centimetres of mercury was necessary. The authors consider that the results obtained on dogs probably approach those that would result from like experiments on man. The facts that the muscular development of a dog's bladder is much greater relatively than that of a guinea-pig's, and that, in dogs, as in man, the ureter enters the bladder at a very sharp angle, are considered sufficient to account for the small percentage of refluxes in them as compared with guinea-pigs.

Pathology of the Genito-Urinary Apparatus in Old Men.—Casper, of Berlin, $^{336}_{\text{No. 13,'94}}$ has made microscopical examinations of the prostates of 28 old men: 24 were hypertrophied and 4 were affected by arterio-sclerosis without hypertrophy. In the first 24 cases the aorta was found involved in an arterio-sclerosis which, in turn, existed only eight times in the kidneys, eight times in the vesical arteries, nine times in the vesical arterioles, and four times in the prostatic and the periprostatic vessels. As for a general arterio-sclerosis of the urinary tract, the nearest approach to such a condition discovered was in 2 cases where the kidneys, the bladder, and prostate were so affected. In 2 cases, also, the bladder and prostate were affected, in 3 the kidneys and the prostate, and in 3 the kidneys and the bladder. These results go to disprove the assertions of Guyon and Lannois, that a relation exists between prostatic hypertrophy and a general arterio-sclerosis of the urinary tract.

Hydatids.—Routier, of Paris, $^{3}_{\text{Mar.28,'94}}$ reports an interesting case of retrovesical hydatid in a man of 32 years. The symptoms presented were similar to those of advanced vesical obstruction, such as are often observed in extreme cases of prostatic hypertro-

phy. The cyst could be demonstrated by hypogastric and rectal palpation. Laparotomy was performed and the cyst successfully dissected out. Sawkins, of Sydney, $^{267}_{\text{Nov.15,'93}}$ also cites two such cases. The first one died without operative interference. The second one submitted to laparotomy; the cyst-wall was stitched to the external abdominal wall and then opened, continuous drainage being established. This patient was discharged cured.

Karewski $^{69}_{\text{Nov.,'93}}$ describes a case of hydatid of the kidney. An abdominal incision was made and the cyst stitched to the external abdominal wall, and three days afterward the exposed area of the cyst was incised and continuous drainage established, the patient recovering but slowly. The author states that usually these renal hydatids rupture into the renal pelvis, giving rise to symptoms similar to calculous pyelitis. Less frequently they do not communicate with the urinary tract, but appear as large tumors of doubtful character. He advocates attacking these growths by the lumbar rather than by the transperitoneal route.

Elephantiasis.—L. L. Hill, of Montgomery, Ala., $^{9}_{\text{June 30,'94}}$ asserts that elephantiasis is of fairly common occurrence in that part of Alabama known as the "Black Belt," and records six cases in his practice, and wishes to correct the erroneous impression, which seems to be quite prevalent, that this disease is of great rarity in America. Humbert $^{3}_{\text{May 25,'94}}$ records a case of elephantiasis of the penis subsequent to a gonorrhœal lymphangitis, and Mermet $^{100}_{\text{May 24,'94}}$ a similar involvement of the scrotum following a strumous gonorrhœal bubo.

The Influence of Piperazine on the Urine.—D. D. Stewart, of Philadelphia, $^{80}_{\text{Feb.15,'94}}$ as the result of a seemingly very thorough investigation, concludes that piperazine does not increase uric-acid excretion, but apparently exerts a salutary effect on the uric-acid condition, its action probably being similar to that well known of many alkalies, when administered in this class of cases. Wittzack $^{34}_{\text{No.28,'93}}$ has also experimented with this drug, giving it in doses of 1 gramme (15½ grains) per day. He concludes that its action is diuretic and that it decreases the acidity of the urine. The action of the drug, however, is slow, no result manifesting itself till 15 grammes (½ ounce) have been taken.

Bacteriology.—R. Barlow, of Munich, $^{45}_{\text{'93}}$ contributes a long and carefully-prepared article on the etiology, prophylaxis, and

therapeutics of cystitis. He weighs the questions of vesical distension and stagnation of urine and inflammation as factors in aiding infection, the relative virulence of various bacteria and the changes produced in the urine by them, together with the question as to whether gonorrhœal cystitis is to be classed as due to a mixed infection or to the gonococcus alone. The author finally proposes the following classification of the various forms of the disease: (1) chemical cystitis (cantharides); (2) bacillogenic cystitis (tubercle bacillus, bacillus coli commune, urobacillus liquefaciens septicus, coccobacillus); (3) coccogenic cystitis (gonococcus, staphylococcus, streptococcus, diplococcus). In considering prophylaxis, the conclusion is drawn that perfect disinfection of the urethra is not possible in practice, but that perfect disinfection of catheters is attainable, the means advocated being steam or immersion in solutions of 1 to 1000 of nitrate of silver or bichloride of mercury for fifteen to thirty minutes. Little reliance is placed on the efficacy of the internal administration of drugs to accomplish sterilization of the urine.

E. L. Keyes, of New York, $^{5}_{\text{June,'94}}$ in a study entitled "Nephritis in its Surgical Aspects," after a *résumé* of the literature bearing on urinary infection, considers, from a practical point of view, the measures to be employed not only in guarding the kidney against infection, but also in eliminating or modifying it in case these organs are already involved. In this connection the author states that the ends to be kept in view are (1) to avoid all unnecessary traumatic violence and (2) to maintain asepsis, particularly when the urine is clear, and more especially so when there is a weak bladder, residual urine, and dilated ureters. When the bladder and kidney are already in chronic suppuration the indication is to attempt to destroy micro-organisms by direct antiseptic applications below, and to sterilize the urine by medicines from above. The method advocated for instituting catheter life is as follows: A rubber catheter is kept constantly in a 1 in 4000 bichloride solution and washed in very hot water after each use. Simple glycerin is the lubricant. The anterior urethra is to be flushed as the catheter enters for the first time, and all the way in through the membranous and prostatic urethra, with a 1 in 4000 bichloride solution. The urine is to be entirely, but very slowly, drawn off (watching the pulse), the patient being recumbent. The bladder

is then to be immediately washed out with a 1 in 1500 (sometimes 1 in 2000, if the stronger cause too much pain) nitrate-of-silver solution, which usually occasions moderate temporary tenesmus. The bladder may then be washed out with a 6-per-cent. salt solution (heaping tablespoonful to the quart—litre), this to be drawn off, and such quantity of a weaker salt solution (teaspoonful to the quart—litre) introduced and left in as the surgeon may think best. The clean catheter, taken out of its bichloride solution and rinsed in hot water, and the salt solution are to be used as often as any catheter is called for, further urethral flushing being a matter of personal judgment; the nitrate of silver repeated every one, two, or three days.

The article concludes with a bacteriological study, the details of which were carried out by Dunham. Numerous agents, such as are commonly employed to disinfect the urethra and bladder, were selected and their germicidal powers, in varying strengths, tried with reference to certain specified varieties of bacteria. Besides this, numerous drugs, such as are usually given by the mouth with the object of rendering the urine sterile, were administered to two individuals, whose urine, so medicated, was afterward used as a culture-medium. The results of those experiments are recorded very minutely in tabulated form. In a general way it is shown that, for fresh infections,—*i.e.*, where the germs are mostly on the surface of the mucous membrane,—nitrate of silver, 1–2000, is most effective; that for longer-standing infections, bichloride of mercury, from 1–1000 to 1–4000, is better; that bacterial growth is not inhibited in urine where an attempt at sterilization by internal administration of drugs has been made. The author lays great stress on the importance, in this connection, of flushing out the urinary tract by spring-waters having diuretic properties. The conclusions of Keyes are as follow:—

1. Healthy urine is sterile. 2. Purulent urine is always microbic. 3. Microbic infection takes place from within the body by a number of methods in the course of disease; it is often brought about by instrumental manœuvres on the part of the surgeon. 4. A healthy organism and vigorous bladder may cope successfully with microbic invasion and rid itself spontaneously, or with a little aid, of all damage arising therefrom, showing little or even no inflammatory response. 5. A suitable con-

dition of the patient's soil is essential to the propagation and perpetuation of inflammatory phenomena upon the urinary tract, after microbic invasion. 6. This condition, intensified by traumatism and physical weakness, notably of the degenerative variety, is most intense when there is vesical distension with atony, and when the ureters are dilated and the kidneys involved in the changes incident to tension below,—namely, atrophy and sclerosis above, with or without surface catarrh. 7. Under these circumstances surgical pyelonephritis is most likely to declare itself as a result of microbic infection from below (occasionally from above), in the course of suppurative disease or after operative interference. 8. Asepsis, antisepsis, and sterilization of urine are ends to be aimed at in genito-urinary surgery; but, like all other greatest goods, not yet attained in perfection. Much, however, can be done by local means in a prophylactic and curative way, little by internal medication, and possibly as much or more than by any other means by flushing the urinary passages with natural mineral waters.

Max Melchior, of Copenhagen,[2033/93] has investigated 36 cases of cystitis, finding the bacterium coli commune in 25 of them seventeen times in pure culture. The streptococcus pyogenes occurred as a pure culture three times in 5 cases, the urobacillus liquefaciens septicus (*Proteus Housen*) once as a pure culture out of 4. Besides those germs, there were also found tubercle bacillus (three times), diplococcus ureæ liquefaciens (three times), staphylococcus ureæ liquefaciens (three times), streptobacillus anthracoides (three times), gonococcus (once), and typhoid bacillus (once). The author asserts that, as a rule, germs introduced into a bladder in which there is no stagnation of urine or inflammation are speedily expelled without producing infection. The urobacillus liquefaciens septicus (*Proteus Housen*), however, is a marked exception to this rule, its simple introduction into a healthy bladder being sufficient to set up a grave form of cystitis associated with ammoniacal changes. This bacillus was also found to be pyogenic and extremely toxic. When introduced into the circulation it always produced a severe grade of nephritis. The experiments of Krögius and Schnitzler confirm those of Melchior with reference to this bacillus. Numerous other interesting experiments were made to determine the nature of the germs inhabiting the normal

urethra of males and females. In searching for the source of infection in his 36 cases the author concludes that the introduction of instruments accounted for 18. In 2 cases urethral strictures and lesions due to former gonorrhœas and in 1 case a fresh gonorrhœa were the apparent causes. In 6 female cases the cystitis appeared without apparent cause, the short urethra, as Guyon has found, probably allowing germs to penetrate the bladder. In 1 case the cause was an abscess discharging itself into the bladder. In 6 cases the infection was a descending one. In the 2 remaining cases, which were tubercular, the infection was supposed to have occurred through the bladder-walls.

Krögius, of Helsingfors, $^{266}_{\text{Mar.,'94}}$ records eight cases where bacteria in large amounts were always to be found in the freshly-voided urine, unassociated, however, with any subjective symptoms indicating inflammatory processes of the urinary tract. Three of his cases were males and five females, and in none were the kidneys apparently at all involved. Antiseptic vesical lavage, although it diminished the bacteria, did not eliminate them. The source of the germ infection in these cases is not definitely determined, although in one of them, at autopsy, no kidney nor pelvic lesion existed. It is probable that some of the cases are of the nature of those described by Reymond (see last year's ANNUAL), to which the author refers.

Huber, $^{20}_{\text{B.134,p.209,'93}}$ in investigating the etiology of cystitis, has made bacteriological studies in six cases. Schmidt and Aschoff, of Strasburg, $^{266}_{\text{Dec.3,'93}}$ have made an extensive investigation of pyelonephritis from an anatomical and bacteriological point of view, and of the etiological rôle of the bacillus coli communis, in affections of the urinary apparatus. The experiments and investigations are very thorough, and confirm, as a rule, much that has already been done by other investigators.

Sittmann and Barlow $^{326}_{\text{V.52,p.250,'94}}$ record a case of chronic pyelonephritis followed by a pneumonia that proved fatal. The autopsy, eleven hours after death, showed the bacillus coli communis in the blood taken from the median vein.

Antisepsis in Catheterism.—Guyon $^{266}_{\text{Mar.,'94}}$ presents a practical article on this subject. Stress is laid on keeping the inside of the catheter clean on drying it, and on having its eye as near the end as possible, so as to avoid a *cul-de-sac*, rendering it difficult to

clean. The agents used to sterilize instruments are classed as (1) physical agents,—dry heat, steam, and hot water; (2) chemical agents,—antiseptic liquids and gases. The advantages, disadvantages, and efficacy of these various agents are discussed. In the second part of the article the subject of vesical and urethral lavage, in connection with catheterization, is considered. The same author, $\frac{212}{\text{June 10,'94}}$ in another article on the same subject, advocates, as a lubricant for catheters, a mixture of glycerin, powdered soap, and water, to which, in order to insure antisepsis, enough bichloride of mercury to make it 1 to 5000 is added. This lubricant is stated to be very unctuous and non-irritating.

R. Kulner, of Berlin, $\frac{116}{\text{July, Aug., Sept.,'94}}$ publishes a series of articles on antisepsis and exhibits apparatus, mention of which was made in the last ANNUAL. Forkas $\frac{622}{\text{No.10,'93}}$ and E. Frank $\frac{266}{\text{Feb.,'94}}$ also write on this subject and present apparatus for effecting sterilization of instruments.

The Gonococcus.—E. Finger, of Vienna, assisted by Ghon and Schlagenhaufer $\frac{50}{\text{Sept.8,'94}}$ presents a valuable contribution on the biology of the gonococcus and on the pathological anatomy of gonorrhœa. The best method of cultivating the gonococcus, according to these authors, consists in placing some of the gonorrhœal pus upon a mixture of urine and agar-agar. Finger holds that the gonococcus does not develop in alkaline media, but thrives in acid media. The best temperature for development is 36° C. (96.8° F.), temperatures oscillating between 25° and 30° C. (77° and 86° F.) being unfavorable, and temperature of about 40° C. (104° F.) killing them. Dryness is also fatal. Inoculations were made in subjects just recovering from acute gonorrhœa and in those suffering from chronic discharges, some of which were gonorrhœal and some of which were not. The following results were obtained: 1. Neither convalescence from acute gonorrhœa nor a chronic discharge guards one against gonorrhœal infection, re-infection and super-infection being possible. 2. The inoculation of acute gonorrhœa exercises a favorable action upon the cure of a chronic discharge. 3. Posterior urethritis shows itself in from two to three weeks after inoculation. Finger has not completely succeeded in producing gonorrhœa in animals. By the injection of gonococci into a joint he has produced a synovitis which healed spontaneously. Injected into the peritoneal cavity, gonococci set up a circumscribed peri-

tonitis, but in the experiments these germs died at the end of twenty-four to forty-eight hours. Inoculations were also made in the urethræ of individuals when death was imminent and the urethræ examined after death, an acute perifollicular inflammation being found, as well as a desquamation of the epithelium with an infiltration of pus-cells into the connective tissue, and a purulent catarrh of the diverticuli of Morgagni and of the ducts of the glands of Littré. The gonococci were found only on the surface of the pavement epithelium of the fossa navicularis, while they had penetrated the entire depth of the cylindrical epithelium. A case of death from gonorrhœa is also recorded in which gonococci were found in connection with numerous internal organs which had been acutely inflamed. As the result of these studies, Finger concludes that (1) gonorrhœal rheumatism is a true gonorrhœal affection (*i e.*, one caused directly by gonococci); (2) the gonococcus is introduced into these parts in the pus-cells; (3) contrary to the generally-accepted opinion, the gonococcus is able to cause suppuration of the connective tissue.

Dinkler $_{\text{V.26,p.696,'94}}^{45}$ has made a post-mortem examination of a man who died during the acute stage of a gonorrhœa. His results go largely to support those of Finger. Dinkler's case, however, was apparently more acute and severe than those of Finger. In many places along the urethra the epithelium was detached and infiltrated or necrosed, that remaining in place being changed to the pavement variety. The submucous tissue under this epithelium was here and there infiltrated, and where there was no epithelium left the connecting tissue was suppurating and necrosed. The capillaries were thrombosed in spots, where the connective tissue was in a state of suppuration. In other places the urethral walls were thickened and infiltrated. The gonococci were not numerous and were found in the superficial layers of the epithelium and of the suppurating submucous tissue. [This subject died of tubercular cerebro-spinal meningitis. It is possible that the gonorrhœal process in such an individual may have been unusually severe.]

Bordoni-Uffreduzzi $_{\text{No.22,'94}}^{69}$ reports a case of gonorrhœa complicated by polyarthritis, in which the pus removed from a joint was found to contain gonococci. The author inoculated the urethra of a subject with a culture taken from the second generation of these gonococci and succeeded in producing a gonorrhœa.

Crippa [113 Nos.35,36,'93] reports two observations of gonorrhœa which had existed from three to four days, with œdema of the frænum. The œdematous areas were punctured and the exuding fluids, on examination, were found to contain gonococci. In one instance cultures were made. In the discussion on the blennorrhagic process at the Eleventh International Medical Congress, Touton, of Wiesbaden, maintained, in accordance with the results just recorded, that the tissues beneath the epithelium are invaded by gonococci as well as the softer epithelial cells, the horny cells not being affected. He also asserted that the affection extends by the lymph-channels. Neisser, of Breslau, however, doubted the invasion of the connective tissue by gonococci except in rare and exceptional instances.

Morel-Lavallée, of Paris, [24 Nov.5,'93] presents an interesting article entitled "Can One Give the Gonorrhœa Without Having it?" and reports an instructive clinical case. The point of the article is that the gonococcus, implanting itself on some mucous membranes, produces very little inflammatory reaction, perhaps not enough to give rise to a noticeable urethral or vaginal discharge; yet, should an individual so affected have sexual intercourse, he or she might, and probably would, communicate a virulent gonorrhœa. Werther, of Dresden, [13 Apr.,'94] in an article on the pathology of gonorrhœa, condenses, in an able manner, the literature on the subject.

THE PENIS.

Malformations.—J. M. Mathews, of Louisville, [224 Jan.13,'94] reports the case of a man, 30 years old, who came under observation with the following peculiar congenital deformities: There was no penis, although the testicles were well developed. The urethra opened into the rectum about an inch above the sphincter. The urine was apparently discharged into the rectum at intervals, and then expelled in turn from that organ independently of the regular act of defecation. Mermet, of Paris, [7 No.9,'94] reports five cases of congenital valves of the prepuce, discovered in examining ten thousand individuals for that purpose. This condition is rare and was first reported by Thiery (see ANNUAL, 1892). The latter [7 No.11,'94] also reports another case of this deformity.

Zöller, [761 B.11,H.1,'94] in an article on the surgical treatment of hypospadia and epispadia, states that 20 such cases were operated on in Czerny's clinic, the methods employed being those of Thiersch,

Krönlein, Duplay, and Dieffenbach, according to the nature of the case. In these 20 cases 52 operations were necessary, 29 per cent. of which were secondary. The final results were 7 complete cures, 11 partial cures (there being 1 with incontinence and 10 with fistulæ), and 2 failures. E. Loumeau [188 Sept.9,'94] compares the different grades of hypospadia with the corresponding stages of fœtal development, dividing the deformities into three types, according to the period of arrested development. The article is fully illustrated.

A. Caddy [6 Sept.15,'94] reports an interesting case of congenital torsion of the penis. His description is as follows: From where the penis joined the scrotum in front the organ took forward very nearly a complete half-turn to the left, so that the position of the slit-like meatus urinarius, which occupied the apex of the glans penis, was reversed, and the frænum preputii lay uppermost. The pigmented raphé under the penis, continuous with the median raphé of the scrotum, was very well marked, and was to be seen coursing along the left side of the penis, over the dorsum, and slightly on to the right side; then, turning on itself, it joined the frænum preputii above. There was no sign of epispadia or hypospadia present, and the patient said that the stream of urine flowed straight downward, and was not deflected to the right or left. The author, on looking over the literature, was able to find little or no mention of such a case. Torsion associated with epispadia or hypospadia has been observed.

Mutilation of the Penis.—J. G. Garson [22 Feb.21,'94] describes the different forms of mutilation, together with the methods to which the natives of Australia subject the penis so that impregnation may be impossible. They accomplish this result by producing an artificial hypospadia. Sometimes an incision is made through the urethra, just in front of the scrotum; at others a portion of the anterior canal is dissected out or the whole penile portion may be slit open.

Fracture of the Penis.—Gabszewicz [26 Dec.1,'93] reports such an accident caused by forcibly bending the organ when in a state of erection. Urinary infiltration and extensive gangrene of the sheath resulted. The author performed a plastic operation by transplanting a scrotal flap. The result was so perfect that the patient afterward experienced no discomfort on erection.

Quattro-Ciocchi [589 Mar.24,27,'94] reports a case of gangrene of the sheath of the penis following chancroid, where a satisfactory result was obtained by transplanting a scrotal flap.

Chronic Inflammation of the Corpora Cavernosa, Causing Curvature of the Penis on Erection.—Stukowenkow [21 June 30,'94] reports four cases of this condition. Jonathan Hutchinson, [806 Apr.,'94] in an article reviewing the literature of the subject, lays stress on the theory that a considerable number of these cases are analogous to those of Dupuytren's contraction, the fibrous sheath of the penis being contracted just as is that of the palms and soles.

Persistent Priapism.—Rathelot [46 Mar.15,'94] reports an interesting case in which priapism suddenly occurred in a man apparently in good health, and persisted for a month in spite of treatment.

Traumatic Chordee.—Nelson, of Syracuse, [1 May 5,'94] reports an aggravated case of this nature occurring after an internal urethrotomy, where, on complete erection, the distal portion of the organ bent downward at an angle of about forty-five degrees.

Circumcision.—M. Ricketts, of Cincinnati, [1 Apr.7,'94] reports the last 50 of 200 cases of circumcision. In performing these operations the author condemns scissors, but advocates shears, on the ground that they cut the foreskin smoothly, and without inflicting injury to the tissues sufficient to interfere with primary union.

Tuberculosis.—Malecot [266 Nov.,'93] records a rare case of tubercular ulcer surrounding and involving the meatus, about the size of a ten-cent piece. The patient was 14 years old, and had been circumcised eight days after birth. The appearance of the ulcer, its softness, and the absence of glandular enlargement excluded the idea of hard chancre. The smooth base, absence of suppuration, and the regularity of its border excluded chancroid. It was not painful. The patient had for three years been suffering with bladder trouble. Micturition was frequent, painful, and at times bloody. Although no bacilli could be detected in the ulcer, it nevertheless produced tuberculosis in guinea-pigs, and so demonstrated its tubercular nature. There had been little change in the appearance of the ulcer during a year of observation.

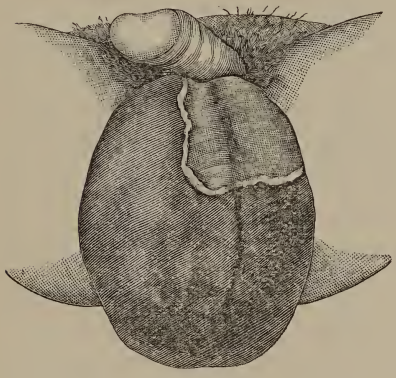
Ziessl [827 Mar.14,'94] reports three cases of gumma of the penis. S. Baumgarten [622 No. 14,'94] reports a case similar to that of Touton (see ANNUAL of 1894), of gonorrhœal involvement of the sebaceous glands

of the penis. The latter case was also complicated by hard keloid growths in the region involved.

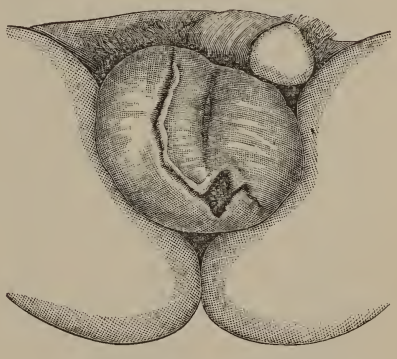
Butjägin [336 Mar.31,'94] reports sixteen cases of cancer of the penis observed in Ssinitzin's clinic. The various features presented by these cases, together with the subject of cancer of the penis, are considered.

SCROTUM, TESTICLE, AND CORD.

Gangrene of the Scrotum.—C. W. Allen, of New York, [245 Feb.,'94] reports an interesting case of this condition. There was no definite cause for the gangrene, the patient, while intoxicated, having suddenly experienced a pain in the scrotum. Soon afterward the parts became œdematous, and later gangrenous. Allen had accu-



ALLEN'S CASE SHOWING THE EXTENT OF THE GANGRENE.



ALLEN'S CASE AFTER NATURAL REPAIR HAD TAKEN PLACE.

Journal of Cutaneous and Genito-Urinary Disease.

rate drawings made, illustrating the disease at its height and also the appearance of the parts after the slough had separated and natural healing had taken place. One of the objects of the paper was to insist on conservatism in the surgery of these cases, leaving the repair largely to nature. By so doing there is almost always enough tissue left to subsequently cover the testicles.

E. E. Kelly, of San Francisco, [147 July,'94] also reports a case of extensive gangrene of the scrotum. In this case the slough involved, to a limited extent, the sheath of the penis. Natural repair took place in seven weeks.

Eugene Fuller, of New York, [245 Feb.,'94] writes on the requisites of a suspensory bandage, showing that, to be serviceable, the pattern should vary according to the contour of the patient. Thus, a

bandage which would be of value to a person with a waist similar to Fig. 1 might be of little value to one similar to Fig. 2. All suspensories should have a firm, non-elastic waist-band in order to secure real support to the scrotal contents, and for some figures a bandage similar to the one recommended by Diday is to be advocated. When a patient is put to bed with an acute epididymitis and scrotal support is attempted, the testicles should be so drawn up as to rest on the pubic bone, thus removing all tension from the cord. Lambs' wool is to be recommended as superior to cotton-batting when a soft packing is required about the scrotum, since

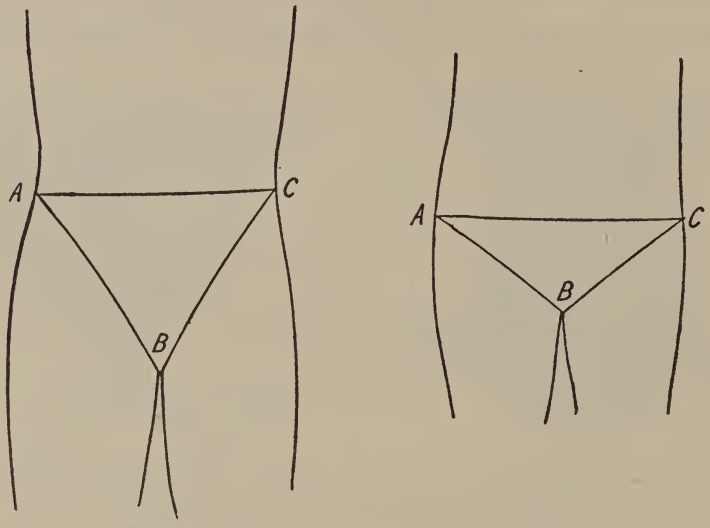


FIG. 1. FIG. 2.

SUSPENSORY BANDAGE. (FULLER.)

Journal of Cutaneous and Genito-Urinary Disease.

it does not become hard and compressed, but preserves a greater elasticity. A modification of the bandage suggested by Wickham (see last ANNUAL) is suggested. With regard to this modification the author says: "After several rather unsuccessful attempts to neatly adjust such an appliance as represented by Wickham, a single roller being employed, the idea occurred to me to use a double roller and to imitate the well-known procedure employed in bandaging the head with the double bandage. By so doing one end of the roller made continuous circular turns about the waist, while the other made backward and forward turns from over the pubes to either side of the sacral region and back again, each loop of the

transverse bandage encircling and being held by the corresponding circular turn of the other end of the bandage. By these means the entire scrotum, wrapped in its wool envelope, can be neatly and very effectively secured, a slight elliptical space being left in front through which the penis projects. Behind, the backward turns of the bandage deviate to either side, thus leaving the rectal region free. This bandage is especially serviceable in inflammatory cases where it is not practicable for the surgeon to insist on rest in bed." The importance of so supporting the testicles, in inflammatory conditions, as to entirely prevent all dragging upon the spermatic cord is held to be essential.

Griffiths, of Cambridge, Eng., $^{6}_{\text{Apr.7,'94}}$ has examined the "testes and prostate gland in certain eunuchoid persons,"—that is, persons in all respects like eunuchs except that in them the testes, though small, are in the scrotum. His conclusions with regard to them are: 1. In eunuchoid persons the testes are of small size and almost entirely composed of fibrous tissue, the seminal tubules being represented by fibrous rods with fissure-like lumina containing atrophied epithelial cells. Although thus altered, the testes retain their normal shape and form. 2. The epididymes are large relatively to the bodies of the testes, and the tubules in most of the lobules of the globus major are natural, the tubules in some few lobules being altered as if by chronic inflammation. 3. The prostate gland is small, tough, and fibrous, and the glandular tubules are but few in number and but imperfectly developed; the vesiculæ seminales are also of small size, and devoid of any secretion in their interior. 4. Where the testes lose their power of growth, from whatever cause, the individual develops at puberty like a eunuch deprived of his testes in early life.

Perineal Displacement of the Testicle.—B. Pollard, of London, $^{6}_{\text{July 14,'94}}$ records such a case in which he operated with perfectly successful result. The subject was a child 1 month old, the original appearance being shown in Fig. 1 (next page), as well as the position of the testicle in the perineum. Fig. 2 represents the final result after recovery from operation. Pollard, as seen in Fig. 2, cut down on to the testicle in the perineum and freed it from its attachments. He then made a scrotal cut, through which traction was exerted on the misplaced organ, thus drawing it into position. T. Hudson $^{22}_{\text{Oct.11,'94}}$ also reports a case of this nature, in which he was

able to place the testicle in proper position by means of an operative procedure similar to that adopted by Pollard.

Supernumerary Testicle.—Lane [22 Aug.29,'94] reports a case of this nature in which he removed the extra organ. The corresponding testicle was examined through the incision made for the removal of the third testicle, and was found to be perfect in all respects.

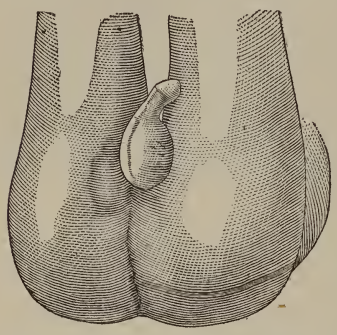


FIG. 1.—PERINEAL DISPLACEMENT OF TESTICLE. (POLLARD.)
Lancet.

Torsion of the Spermatic Cord, with Partial or Complete Rotation of the Testicle.—E. Owen, of London [6 Nov.18,'93]; C. Lauenstein, [404 No.92,'94] L. Defontaine, [1043 Mar.,'94] Lexer, [41 Feb.22,'94] Anders, [21 No.47,'93] and R. W. Johnson, [96 May,'94] all report cases of this nature, partial or complete necrosis of the strangulated testicle resulting. Owen, Lauenstein, and Johnson each review all the literature on the subject which has come to their notice. Lauenstein gives Nicoladoni the credit of first calling the attention of the profession, in 1885, to this condition. This interesting accident has received considerable attention in previous issues of the ANNUAL.

Paget [6 Nov.3,'93] reports a case of strangulation of the testicle in which no twisting of the cord had taken place. The case was that of a boy with an undescended testicle. On lifting a weight the testicle was suddenly pressed out of the inguinal canal into the scrotum. This sudden descent was speedily followed by necrosis of the organ.

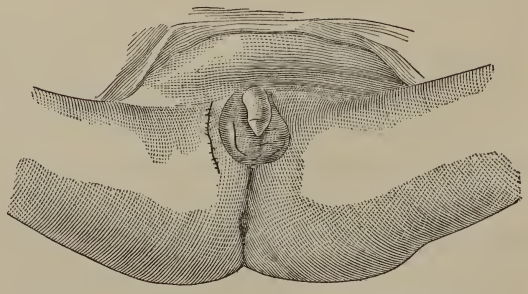
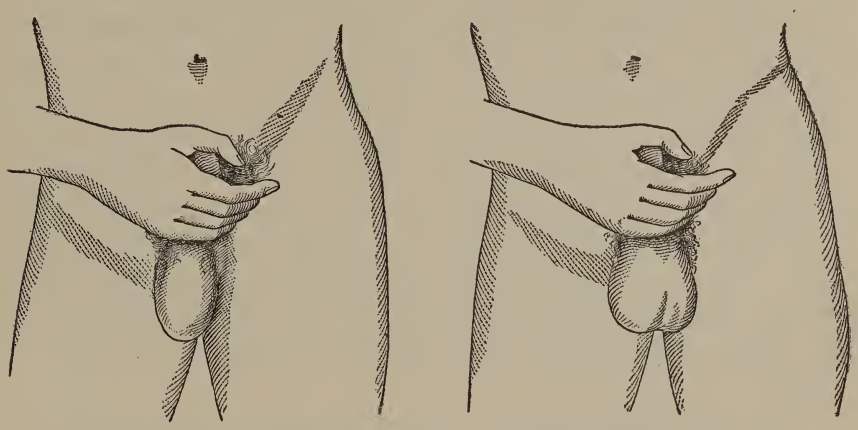


FIG. 2.—PERINEAL DISPLACEMENT OF TESTICLE. (POLLARD.)
Lancet.

Bogdan, of Lassy, [223 No.5,'93] reports a curious and very interesting case of gangrene of both testicles, occurring in the course of a blennorrhœa.

Weir, of New York, [59 Aug.11,'94] and R. Guiteras, of New York, [814 May 1,'94]

both report instances of the implantation of artificial testicles in cases where the original organ had been removed, and in which, for æsthetic reasons, a symmetrical appearance of the scrotum was desired. A smooth piece of celluloid in each case was obtained, resembling a testicle in shape and size. An incision was made into the scrotal tissues, the celluloid slipped in, and the incised parts brought together by sutures. After a time the foreign mass became, in each instance, encysted. The accompanying illustrations represent, in Guiteras's case, the appearance before and after operation. Although these cases are of interest, the indications for such a procedure will naturally be infrequent.



Artificial Testicle. (Guiteras.)
American Medico-Surgical Bulletin.

Orchitis and Epididymitis.—Catrin [14 Feb.18,'94; 673 Mar.] makes the following observations, based upon the study of one hundred and fifty-nine cases of mumps: Orchitis occurs in one case out of three. It appears generally on the fourth to the eighth day of the disease, though it may show itself later. In mumps it is very rare for inflammation of the testicles to precede that of the parotid gland. This form of orchitis is accompanied by fever, which lasts three or four days, and is more often met with in severe rather than in mild cases of the disease. The inflammation begins in the epididymis, the body of the gland being subsequently attacked. Atrophy of the organ, after such an inflammation, is considered to be more rare than is usually supposed. In a certain number of cases the testicle, after a period of atrophy and loss of consistency more or

less prolonged, regains its original volume and firmness. Where partial atrophy occurs, the spermatozoa and seminal fluid are diminished. Where true atrophy ensues, it is accompanied by loss of reflex action in the cremaster muscle.

Hornus [243 No.7,'94] reports a case of orchitis due to mumps, in which a fatal peritonitis followed the testicular inflammation. At the autopsy the testicles were found to be transformed into purulent collections, with no trace of seminiferous tubules. The spermatic cords were bathed with pus, which continued beyond the inguinal canal. The intestinal coils and the epiploön were covered with purulent and fibrinous deposits. There was nothing wrong with the other organs. Troussaint [243 Oct.,'93] observed a case of acute nephritis with symptoms of cerebral uræmia preceding a double orchitis, due to mumps. In this case recovery finally took place. Arnaud [46 Jan.1,'94] also reports one of these cases, in which a double orchitis was associated with alarming general symptoms, simulating peritonitis or strangulated hernia. There were also inflammations at numerous points, besides gastro-intestinal disturbances, vomiting, colic, and dysentery. Erythema multiforma manifested itself at times. The case finally recovered, though the convalescence was tedious. Faidherbe [220 Feb.3,'94] mentions two cases of orchitis which he attributes to rheumatism, and quotes literature bearing on the subject.

Guaiacol Applications in the Treatment of Epididymitis.—Balzer and Lacour [31 No.28,'94] reports favorable results from applications of guaiacol in the treatment of orchitis. The applications are soon followed by relief of pain and subsidence of the general symptoms, including fever, so that repose and sleep became possible. In the inguinal region pure guaiacol is used, but upon the scrotum an ointment containing from 2 to 5 parts of guaiacol to 30 of vaselin is applied. The applications give rise to some burning pain, but all distress disappears in the course of a few hours. The pain is sometimes permanently relieved after the first application, but, as a rule, two daily are required. As soon as the pain has ceased the applications are withheld, as they do not appear to exert any resolving influence upon the inflammatory exudate. The applications often induce a slight erythema of the scrotum, followed by desquamation and sometimes by fissures. It is suggested that the good effects are brought about principally by a reflex influence

upon the terminations of the cutaneous nerves. It is admitted that cutaneous and pulmonary absorption plays a certain part, but the rapidity of the action indicates a local effect.

Thiercy [22, Sept.27,'93] treats these cases by spraying with a solution of carbolic acid. He considers it superior to emollient applications, and not only to be free from all danger, but also to abridge the duration of the treatment. The apparatus is a steam spray, to be placed on a chair close to the patient. The solution should not exceed 2 per cent.; application should not be made more than one-quarter of an hour twice a day, otherwise the skin would exfoliate. In three or four days all pain has subsided, and the patient can leave his bed provided he wears a suspensory bandage. [The editors, though not disparaging the use of external applications in the treatment of acute epididymitis, nevertheless consider that perfect support to the testicles is the most important feature, and that without it all forms of treatment by means of external applications will be more or less futile and disappointing.]

Büngner [69, Apr.19,'94] claims that, by freeing the vas deferens of the tissues enveloping it and then exerting steady traction on it, four-fifths of the cord can be broken off and removed. He recommends this procedure, for instance, in a case of tuberculosis where the cord is involved, the seminal vesicle remaining largely unaffected.

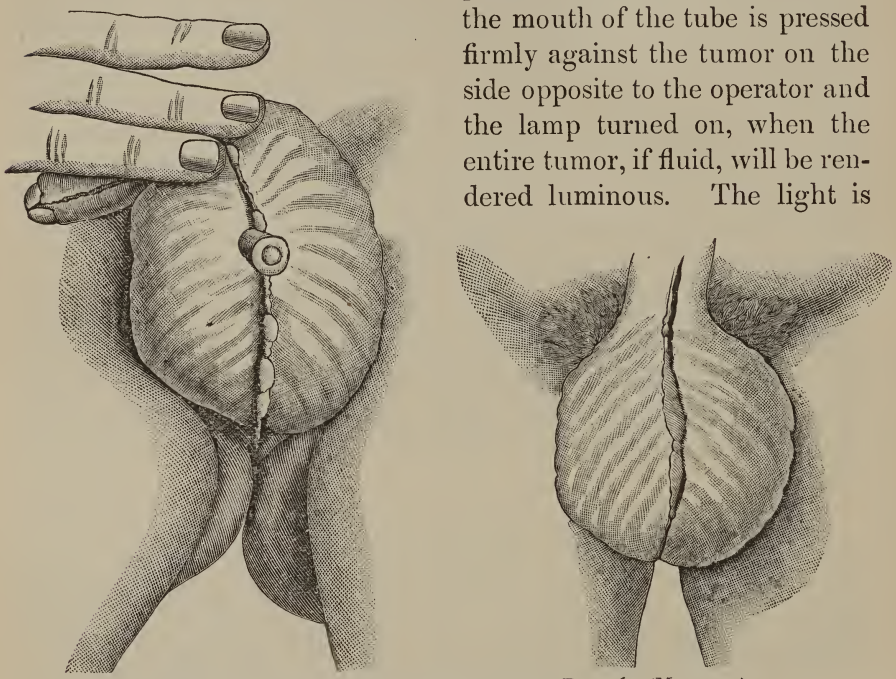
Joseph Griffiths [271, Apr.,'94] has made numerous experiments in order to determine the varieties of hydrocele. He distended the sac of the tunica vaginalis with air post-mortem, and, after hardening the parts in spirit, made sections. A number of drawings are given to illustrate the various shapes taken by the distended sacs.

Neumann, [54, No.20,'93] in the treatment of hydrocele, advocates introducing, under antiseptic precautions, a cannula, which is left in for drainage for two days. During this time the parts are enveloped in antiseptic absorbent dressings. The cannula is then removed, and in from seven to nine days the sac is obliterated by an adhesive inflammation of the walls. Neumann believes that, owing to the presence of the cannula and the altered condition of the pressure produced, a slight exudation of leucocytes takes place, leading to the formation of a fibrinogenous ferment and the occlusion of the sac.

Quattro-Ciocchi [505, Nov.28,'93] advocates introducing into the sac through

the cannula, at the time of tapping, a long strand of catgut, which acts as a foreign body in the sac, thus setting up sufficient inflammation to obliterate it. The catgut is finally absorbed without being removed. Gavin, of Boston, [99 Mar.1,'94] obtains good results by the injection, after tapping, of equal parts of carbolic acid, alcohol, and glycerin.

W. K. Otis, of New York, [245 Dec.,'93] uses a little incandescent electric lamp to detect the fluid in obscure hydroceles. When a suspected hydrocele is presented, the mouth of the tube is pressed firmly against the tumor on the side opposite to the operator and the lamp turned on, when the entire tumor, if fluid, will be rendered luminous. The light is



Dermoid Cysts of the Genito-Perineal Raphé. (Mermet.)
Bulletin de la Société Anatomique.

very powerful, and in most cases the testicle can be readily mapped out and definitely located.

Mermet [7 Nov.1,'94] reports two interesting cases of dermoid cysts of the genito-perineal raphé. The article contains cuts of both these cases, which, owing to the rarity of such instances, it has seemed well to reproduce. The literature of the subject is also reviewed.

Pearce Gould [6 Nov.4,'93] reports a case of dermoid cyst of the spermatic cord simulating hernia; Hue, of Rouen, [121 Feb.,'94] one of enormous lipoma of the spermatic cord; R. W. Taylor, of New York, [245 Aug.,'94]

one of mixed malignant diseases of the testicle, consisting of sarcoma and cystic adenocarcinoma; Brindel, of Bordeaux, [188 Mar.4,'94] one of complex tumor of the testicle. In this case the growth consisted of a purulent cyst, the walls of which contained sarcomatous and osseous elements. Karewski [41 July 2,'94] and Heller [41 Jan.1,'94] also mention instances of sarcoma of these parts.

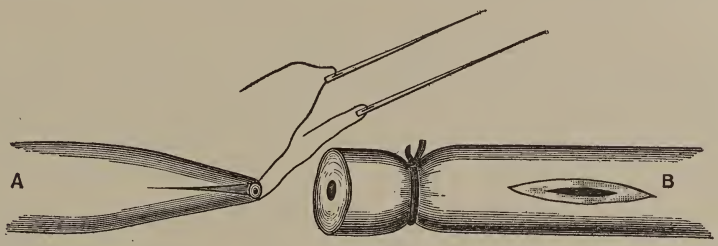


FIG. 1.

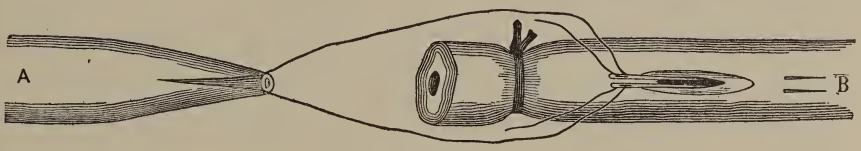


FIG. 2.

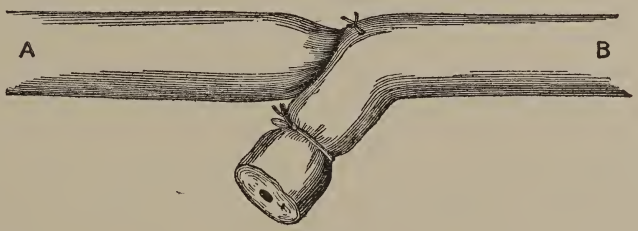


FIG. 3.

VAN HOOK'S METHOD OF GRAFTING THE VAS DEFERENS.

FIG. 1.—A. Testicular extremity of divided vas deferens. B. Proximal extremity. The distal portion, A, has been "sharpened," the opening has been enlarged by a longitudinal slit, and the traction-suture has been introduced. The proximal fragment, B, has been ligated and a slit made in the side.

FIG. 2.—The needles of the traction-suture in the act of being passed through the wall of the proximal fragment from within outward.

FIG. 3.—The distal fragment has been drawn into the proximal segment by means of the traction-suture, which has been tied.

Medical News.

W. Van Hook, of Chicago, [9 June 30,'94] in experimenting on a large dog, cut across the vas deferens, and then united the ends in the same manner as he has done with the ureter. The dog was afterward killed, and good union of the spliced ends without stricture of the canal was found to exist. Van Hook's illustrations show very clearly the different steps in the procedure.

Poncet, of Lyons, [211 Dec.31,'93] reports two cases of cancer of the testi-

cle, both of which were accompanied by malignant enlargement of the supra-clavicular lymphatic glands on the left side. The author thinks that in both these cases the mode of transmission of the sarcomatous material was by the thoracic duct, which receives the testicular lymphatics from both sides and also those from the left supra-clavicular glands.

SEMINAL VESICLES, ETC.

Seminal Vesiculitis.—Eugene Fuller, of New York, [245 June,July,'94] contributes an article on persistent urethral discharges dependent on subacute or chronic seminal vesiculitis, recording the histories of twenty-two cases of chronic urethral discharge which had, in most instances, resisted all usual methods of urethral treatment. In many of these cases no urethral lesions could be detected sufficient to account for the discharge. Subacute or chronic vesiculitis was found to co-exist in all these instances. Treatment was directed toward the vesicles and all urethral measures discontinued, the result being that, in most instances, the discharge stopped as resolution in the vesicles took place. The treatment advocated consisted in stripping the diseased vesicle by means of the forefinger in the rectum, a description of which appeared in the last ANNUAL. The author calls attention to the fact that he has found that the manipulation advocated, of stripping the vesicles, seems often, in the professional mind, to have been confounded with prostatic massage. In a number of instances in which he has delegated this treatment to others, and in which no satisfactory results have followed, this has been the cause of failure. That such should be the case is due to the fact that massaging the prostate, instead of removing any of the inflamed vesicular contents, often simply stirs it up, thus leaving the patient more uncomfortable than before the manipulation.

In speaking of tubercular involvement of these parts, the author says: "I wish also to impress on the professional mind the frequency of tubercular inflammation of the vesicles, and to warn all in these cases to exercise the greatest care in attempting digital rectal treatment, lest the condition of the patient be aggravated rather than palliated. The practiced finger will soon learn to detect this condition either at the first examination or very shortly after commencing a course of strippings, as the result of the

inflammatory reaction produced by the manipulations. The following conclusions are drawn :—

" 1. Seminal vesiculitis is the cause of chronic urethral discharges in a certain percentage of cases. 2. In about one-third of these cases the seminal vesiculitis is tubercular in character. 3. It is most important to differentiate between the simple inflammatory and the tubercular cases, owing to the difference in prognosis and treatment. 4. In the simple inflammatory cases the prognosis is good, unless the subject is of an advanced age, the duration of the treatment depending largely on the chronicity of the case. 5. The treatment employed in these simple cases consists of stripping the vesicles, thereby squeezing out into the urethra their inflammatory contents by means of the forefinger introduced into the rectum. This treatment should be employed once in five to seven days, a long interval being allowed to elapse between treatments should signs of acute inflammation appear as a result of the manipulations. 6. The duration of treatment may be all the way from a month or six weeks in subacute cases to many months and possibly a year in very chronic ones. 7. At the commencement of treatment the parts are usually very tender, indurated, and distended. If the case progress favorably, all these elements gradually diminish and finally disappear as resolution takes place. The discharge customarily wholly disappears before a cure in the vesicles is attained. 8. In tubercular cases the tenderness in connection with the vesicles is not liable to be so great as, and the induration more than, in simple inflammations. In this form of inflammation the parts resent the manipulations, unless, indeed, they be most gentle, and even then it is a question if this form of treatment is beneficial. If the tubercular condition is not diagnosed at first, the manner in which the vesicles, when so involved, resent the ordinary manipulations by becoming more tender and indurated, thus aggravating the urethral symptoms, speedily renders the correct diagnosis apparent."

M. Krotoszyner and J. C. Spencer, of San Francisco, [61] July 21,'94 in an article entitled " Chronic Prostatitis After Gonorrhœa," refer to a new treatment of this condition employed by Posner, of Berlin. This consists in squeezing out the secretion of the prostate gland by digital palpation through the rectum. According to these authors, Posner holds that in many of these cases the ejacu-

latory ducts are also involved in the inflammation. [The editors are of the opinion that the cases of so-called chronic prostatitis of the authors just quoted, which were benefited by digital rectal palpation, were mostly, if not all, instances of seminal vesiculitis associated with urethral discharge, such as have been reported by Fuller in the article previously referred to. They are also of the opinion that the prostatic palpation did good only in so far as it happened to strip the ejaculatory ducts of their contents.]

G. W. Allen, of Boston, $^{9}_{\text{July 28,'94}}$ in a paper on chronic inflammation of the seminal vesicles, states: "Since the latter part of January, when, through Dr. Fuller, whose methods I have closely followed, I became especially interested in this subject, I have examined 74 cases with reference to the condition of the seminal vesicles. In all of these there was reason to suspect that disease of the vesicles might exist. In 55 a more or less abnormal condition was found, both vesicles being affected in 38 of them. In 2 cases the trouble was acute, in 3 subacute, and in the remainder it was chronic. In the acute cases, in 2 of the subacute, and in 31 of the chronic cases there was a history of gonorrhœa. Of 23 cases, all chronic, in which I have been able to follow up the treatment sufficiently long to get definite indications of its effect, there has been improvement in nearly all. In a few it has been marked and speedy, some having practically recovered; in the majority it is still too soon to give final results, while a very few have been disappointing."

Reich, of Vienna, $^{1170}_{\text{May 23,'94}}$ reported a case of acute seminal vesiculitis in which von Dittel reached the sac by a perineal incision, the rectum being displaced to the right and a portion of the coccyx resected. The sac was then opened and tamponed with iodoform gauze. [Such an extreme measure in an acute case of seminal vesiculitis is, in the editors' opinion, to be discouraged except in the event of failure with conservative treatment, the chief element of which consists of absolute rest in bed for two or three weeks. By conservative measures, such cases, if not tubercular, generally get well.]

Schede $^{69}_{\text{Feb.15,'94}}$ reports the removal of a tubercular seminal vesicle and cord. He prefers the method of Rydygier, which consists of a lateral cut extending along the border of the sacrum, to the method of von Dittel, which is the same as that author employs

for the removal of the prostate, and which, as is well known, consists of a lateral cut along the perineum and by the rectum.

Weir, of New York, [59 Aug.11,'94] reports a very interesting case in which he removed both tubercular seminal vesicles. The author did the operation advocated by Roux, which is very similar to Zuckerkandl's, the incision being made in the perineum, beginning at one side of the rectum, curving upward around that organ, and ending at the opposite side.

W. T. Belfield, of Chicago, [61 Apr.21,'94] presents a very interesting and instructive article entitled "Utriculitis, a Contribution to the Pathology of the Prostatic Utricle." The first part of the paper deals with the embryology of the organs of Wolff and Müller. The former goes to make up the genital canal in the male, while the organ of Müller, having no normal function in the male, becomes atrophied and disappears to such an extent that it is with difficulty that any trace of it can be found in adult life. In the female, on the other hand, the organ of Müller is developed, becoming the genital apparatus, while the organ of Wolff atrophies and disappears. Sometimes, however, the organ of Müller in the male does not become completely atrophied. In support of this statement the author makes special reference to the fact that Englisch, in numerous autopsies on newborn infants, has, in a number of instances, found the organ of Müller in a partial state of preservation. When it partially persists, the lower part of its canal is not entirely obliterated, but may remain, being distended as a cyst, in case its communication with the bladder is closed. If this communication is not closed, but is large, the previous canal may appear as a vesical sacculus, or, if small, as an abscess or sac connected with the bladder. These Müllerian cysts, pouches, or sacs, when present, lie in the post-prostatic space between the seminal vesicles. Belfield has demonstrated this condition twice at autopsy, and has had one patient so affected. This case was finally cured by the slitting up of the sinus connecting the sac with the bladder by instruments introduced through a perineal opening.

R. Guiteras, of New York, [6 July 14,'94] reports a case in which there existed an extensive sero-purulent cyst between the rectum and the bladder. Its contents were examined for evidences of echinococci, with negative results, and the author is inclined to consider it as an occlusion cyst of the seminal vesicles. [In the editors'

opinion, however, it seems much more probable that the case was one of cystic formation in connection with Müller's duct, such as Belfield has described. Occlusion cysts of the seminal vesicles are extremely rare, if, in fact, they exist at all. Guelliot has carefully investigated this question, and, although he has found some reported cases similar to that of Guiteras, yet no one has ever, in these cases, confirmed the opinion by an anatomical demonstration, and, as far as known, no pathological collection contains a specimen representing such a condition of affairs.]

URETHRA.

Meisels [84 Nos.31,33,'93] reports two interesting cases of double urethra in male subjects. E. L. Clark, [239 Apr.16,'94] reports a case of urethritis induced by the medicinal administration of arsenic.

Gonorrhœa.—A. Hogge [293 Mar.,'94] has treated fifty-three cases of gonorrhœa, most of them acute, by a lavage of weak solutions of permanganate of potash, according to the method of Janet. The author considers this treatment especially efficacious in acute conditions. Chronic states, however, are less favorably affected, the lesions persisting. Audrey [28 B.18,No.2] has tried Janet's method with favorable results. As contra-indications, he mentions the coexistence of cystitis, follicular urethritis, and epididymitis. M. Furst, [69 Sept.6,'94] however, after an apparently careful investigation of this method, decides against it. He believes that in a few instances it does cut short the disease, but that, in most cases, the treatment is long and tedious, and that, besides being painful, serious complications are liable to result.

Colombini [212 July 10,'94] thinks well of ichthyol in gonorrhœa, used in the form of injections in strength of from 1 to 9 per cent. In very acute cases 1-per-cent. injections subdue pain and diminish the number of erections. The discharge soon becomes sero-purulent. In subacute conditions stronger injections up to 9 per cent. are advocated. In some chronic cases even greater strengths may be employed. The author also uses ichthyol suppositories for acute gonorrhœal conditions of the deep urethra. Villetti [24 No.21,'94] praises ichthyol, preferring a 5-per-cent. solution for injection, and for lavage in gonorrhœal cystitis a 1-per-cent. solution.

Cazeneuve and Rollet [24 Feb.18,'94] advocate gallobromol for both acute and chronic cases. They report having aborted one case by

a 10-per-cent. solution. Their usual method, however, of employing this agent is by irrigations of a 1- or 2-per-cent. solution. Casper and Sander [317, No.3,'94] have not obtained brilliant results from the use of alumnol. They consider it inferior to nitrate of silver in chronic conditions, and of no value above numerous other agents in acute states.

Schaffer [357, June 24,'94] advocates phosphate of silver 1–5000 to 1–4000 for the anterior urethra, and 1–1000 for the posterior urethra, in gonorrhœa. The author considers such solutions to be very destructive to the gonococcus and to have the power of penetration, thus reaching the germs which are beneath the surface.

Feleki, [41, July 26,'94] V. Sehlen, [336, Sept.15,'94] and Funk [41, Apr.30,'94] discuss the early treatment of acute gonorrhœa, abortive methods by strong nitrate-of-silver solutions being employed. Painting the urethra with these solutions seems generally to be preferable to irrigating it by means of a syringe. In quite a percentage of the cases good results were obtained. E. Martin, of Philadelphia, [80, Oct.16,'93] thinks well of a trial of abortive measures, provided the case is seen very early. In a general way the most efficacious treatment is by internal medication combined with local antiseptic washings.

George E. Brewer, of New York, [9, June 16,'94] has made an extensive trial of irrigating the urethra and bladder without the use of a catheter, and is so favorably impressed by the procedure that he has practically abandoned Ultzmann's method, which he formerly employed in deep urethral inflammations.

Lohnstein [69, No.44,'93] has found that the diagnosis of posterior urethritis based on the existence of shreds in the urine passed directly after lavage of the anterior urethra is not reliable. He has proven this by washing out the anterior urethra with a solution of ferrocyanide of potash. The urine passed after this contained shreds colored by the solution. The conclusion is drawn that in 39 per cent. of cases fluids so injected into the anterior urethra also enter the posterior urethra, and that this occurs more readily in acute than in chronic gonorrhœal conditions.

E. Hurry Fenwick [2, Jan.6,'94] finds it of advantage, in obstinate cases of gleet, to combine dyes with the urethral injections prescribed. When such injections are used the urethral shreds appearing in the urine will be colored if they come from the penile urethra, the membrane of which is bathed by the injection; if not, they will

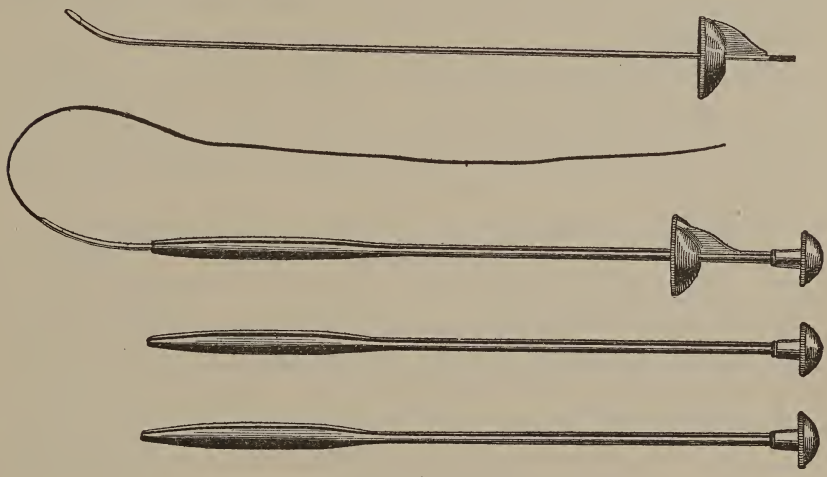
be uncolored. In this way their origin can, in a measure, be determined. F. Tilden Brown, $^{814}_{\text{Apr.15,'94}}$ Bransford Lewis, $^{568}_{\text{June,'94}}$ and Casper $^{116}_{\text{Apr.,'94}}$ present well-written articles on posterior urethritis.

Stricture.—Wassermann and Hallé $^{266}_{\text{pp.244,321,'94}}$ have extensively studied the pathology of chronic urethritis and stricture in fifteen cases: twelve of gonorrhœal and three of traumatic stricture. Their conclusions in many respects confirm those of Finger. They find that the epithelium is always altered. In mild cases it is thickened, tumefied, and partially desquamated. In severe cases it becomes pavement in character and stratified, the deepest layer being composed of prominent, firm cells, the middle layer of polygonal cells of varying thickness, and the external one of flat, horny cells. One of the characteristics of this abnormal epithelium is that it is polymorphous and irregular. Sometimes the epithelial formations are very active, causing hypertrophies; or the reverse may be the case, the epithelium being horny and hyaline. The corpus spongiosum is also involved by a sclerosis, its normal structure being supplanted by a contractile, non-elastic tissue, containing few blood-vessels. The urethral glands and lacunæ are affected in the same manner as the urethral canal, their epithelium becoming pavement in character and their walls infiltrated and sclerosed. The results are that their cavities become distended, owing to the contractive changes in connection with the ducts; sometimes, where complete occlusion occurs, retention cysts result. When extreme inflammatory processes occur, abscess formation may result, associated with burrowing of pus, urinary infiltration, and fistula. Where these inflammatory processes are severe, the authors advocate a removal of the diseased area and resection of the urethra in case an attempt at radical cure is to be made.

J. P. Bryson, of St. Louis, $^{9}_{\text{Sept.1,'94}}$ discusses the radical cure of urethral stricture by the restoration of the mucous membrane to a healthy condition. He cites a case where dilatation and internal urethrotomy had been thoroughly tried with but very temporary beneficial results, the strictured area promptly recontracting. Finding the mucous membrane over this area lustreless and abnormal in appearance, the author directed his attention especially to it. Gentle intermittent dilatation every four to six days was practiced, immediately after which the affected mucous membrane was painted with a 1- or 2-per-cent. solution of nitrate of silver.

After a time the mucous membrane regained, in a large measure, its normal appearance. This treatment was applied in 1887. The patient has been under Bryson's observation at intervals ever since, and no return of the stricture has occurred. The author considers that urine leakage through the damaged epithelium was the original cause of stricture in this instance, and was also the reason why the stricture so promptly relapsed after his early attempts at a cure. As soon as the leakage was stopped by improving the condition of the epithelium, a permanent cure of the stricture resulted.

J. B. White, of New York, $^{245}_{\text{Aug.,'94}}$ in writing on the possibilities of overcoming permanent strictures of the deep urethra without



BIGELOW'S DIVULSOR.

Journal of Cutaneous and Genito-Urinary Diseases.

resort to external urethrotomy, emphasizes the fact that the spasmodic element, always present to a greater or less degree in deep organic stricture, often tends to obscure the judgment of the examining surgeon as to the possibility of overcoming it through a less grave procedure than external urethrotomy. In many such cases, if the penile stricture be cut, the soft, spasmodic, deep one can easily be cured later on by gradual dilatation.

C. L. Scudder, of Boston, $^{245}_{\text{Oct.,'93}}$ presents a study of 404 cases of divulsion of urethral stricture operated on at the Massachusetts General Hospital during the last twelve years, with eight deaths. The instrument used in most of these cases was the Bigelow divulsor, an illustration of which is here given. Histories from the

records of the fatal cases are presented. After thoroughly considering the subject the author concludes that (1) there is a distinct and rational place for divulsion as a surgical procedure; (2) in firm, tough stricture divulsion is contra-indicated; (3) there are soft strictures, but firm enough to cause retention of urine, which yield to very little force, and it is this class of stricture for which divulsion is pre-eminently the operation; (4) the penile stricture is almost always firm, and composed of more dense cicatricial tissue than is the deeper urethral stricture, and in the anterior penile urethra internal urethrotomy seems to be the better operation.

Divulsion with the Bigelow divulsor should be reserved, it seems to him, for soft, deep strictures, unaccompanied by much cicatricial tissue.

[It would seem to the editors that the cases reserved by Scudder for divulsion are such as could be, and usually are, quite satisfactorily treated by the introduction, at one or more sittings, of progressive sizes of gum-elastic bougies or conical steel sounds.]

O. K. Newell, of Boston, [59 June 23,'94] presents a divulsor with a sharp, almost cutting edge, which he claims is suited for the most fibrous strictures. Scudder, in the article just quoted, considers divulsion in hard strictures, such as the Newell instrument is especially intended for, to be contra-indicated. Krisch, of Breslau, [116 Feb.,'94] has also introduced a new dilator modified from the instrument of Oberländer. Neebe, of Hamburg, [116 Jan.,'94] gives his experiences with Oberländer's dilator and electro-urethroscope.

Sir W. MacCormac, [1077 July 25,'94] in a lecture on stricture of the urethra, speaking of divulsion and Holt's instrument, states: "It has been claimed for this method that it stretches the parts without lacerating the mucous membrane, but I am very sure that in the majority of cases the mucous membrane is lacerated. In an old-standing case such as this method would be used for, the mucous membrane has very likely been altered in character by ulceration, and has, in fact, become more of a scar-tissue and intimately adherent to the subjacent structures. The whole thing being continuous tissue, that it can be forcibly dilated without a breach of surface I do not believe. The fact that this is so has been proved more than once by the fatal consequences which have followed the use of the method. I do not know that at the present time this

instrument is ever used. I think the conditions for its use do not obtain, and I do not know that any surgeon would be willing to employ it nowadays." [This tends to show how little the method is practiced in England, where, at one time, it had its chief stronghold.]

Rollet, of Lyons, [211 Mar.25,'94] reports a very instructive case of stricture in which the perineum was riddled with fistulæ. The perineal tissues were brawny and cartilaginous. The author removed this inflamed perineal mass, which was about the size of an orange, and with it two inches of the strictured urethra. A catheter was then introduced through the penile urethra and through the posterior segment into the bladder. The remaining perineal tissues were drawn up about the catheter and secured by two layers of catgut sutures. The external strictures were held in apposition by metallic sutures. The perineal wound healed solidly by first intention. The catheter was kept in place thirty-six days. After that the bladder was washed through the urethra without the aid of a catheter. This case seems to be very successful, as five months after the operation the immediate good result still persisted.

Southam, of Manchester, [6 July 7,'94] cites two cases of obstinate perineal fistulæ, both of which he cured, one by suturing the internal opening at its urethral connection and the other by cutting out the fistulous tract and resecting the strictured urethra. The subsequent stages of the operation were much the same as in Rollet's case.

W. Anderson, of London, [6 June 2,'94] reports a case of rupture of the urethra treated by immediate suture of the divided ends of the canal. In this case the result was very satisfactory, there having been no subsequent stricture formation at the seat of injury. Frank [336 No.42,'93] also describes a similar case with like satisfactory results.

Villard, of Montpellier, [348 July 1,'94] presents a general article on resection of deep strictures combined with urethroplasty.

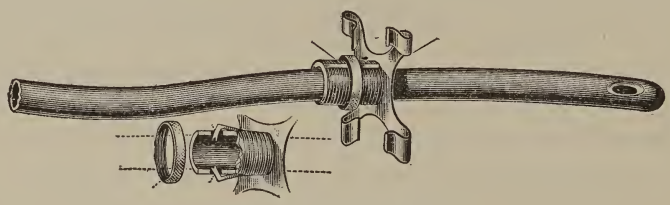
Sapiejko, of Kief, [266 Aug.,'94] reports that for the last eight years he has been making transplantations of the mucous membranes of guinea-pigs, fowls, dogs, and monkeys on man with success, although in some cases the grafts gradually atrophied after a month or so. He also successfully employed mucous membrane

taken from the lip or vagina in the human subject, transplanting it, in all his first experiments, on the eyelid in cases of ectropion. In three cases of excision for urethral stricture he successfully transplanted human grafts taken from the lip. In these operations he followed, in the main, the procedure of Wölfler.

Loumeau, $^{188}_{\text{Aug.19,'94}}$ for the cure of some obstinate urethral fistulæ, advocates suprapubic cystotomy combined with long-continued drainage. The same author $^{188}_{\text{May 20,'94}}$ reports a rare case of gumma of the penis which, by breaking down, occasioned a penile fistula.

H. Goldenberg, of New York, $^{59}_{\text{Mar.24,'94}}$ reports a case where he found wedged in the urethra of a boy a date-seed the circumference of which was considerably larger than that of the meatus. The author suspects that the seed entered the bladder from the bowel by the aid of an ulcerative process.

F. Tilden Brown, of New York, $^{245}_{\text{June,'94}}$ presents a perineal tube-holder, which he describes as follows: The holder is of light silver



TUBE-HOLDER. (BROWN.)

Journal of Cutaneous and Genito-Urinary Diseases.

construction except the two steel springs; these have sharp teeth which hold, but do not puncture, the rubber tube. The springs release the tube by turning the screw-collar. The cylinder has a calibre of thirty-five French, and the spring-teeth have play sufficient to hold any tube of from thirty-five to thirty-two French. Tapes or narrow bandages slipped under the horns of the plate, then brought up radiating and secured to a waist-band in front and behind, hold the apparatus in place.

J. Englisch $^{283}_{\text{V.39,'94}}$ gives, as predisposing causes for urethral fever, organic disease of the urinary apparatus, abnormalities of secretion, a constitutional dyscrasia (such as tuberculosis), conditions of the blood (malaria), nerve-derangements, and alcoholism.

G. Buckston Browne $^{26}_{\text{Feb.1,'94}}$ considers the question of the introduction for the first time of a catheter, bougie, or sound into the male urethra, together with the results which may or may not

follow. This article is of value, as it serves to impress, on the profession at large, care in primary urethral procedures.

F. S. Watson [99 Aug.16,'94] cites ten cases of urinary retention in which the causes were unusual. F. Lœwenhardt [336 Apr.23,'94] describes the Nitze-Oberländer electro-urethroscope, the object of which is to illuminate the posterior urethra.

In Fig. 1, *a* represents the electrode attachment which is slipped on to the rim of the endoscope. The plates *c* and *c* are isolated from each other by a non-conducting material, *e*; *g* is a

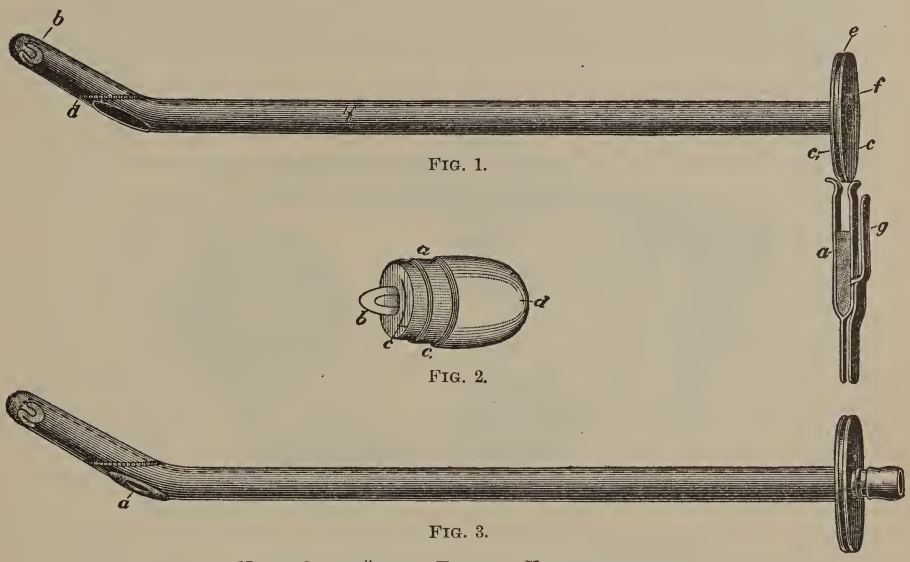


Fig. 1.

Fig. 2.

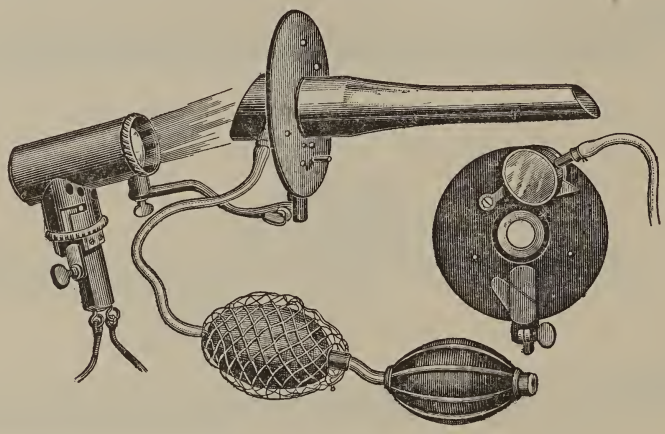
Fig. 3.

Nitze-Oberländer Electro-Urethroscope.
Centralblatt für Chirurgie.

spring which must be pressed against the plate in order to complete the circuit; *b* is the lamp and *d* the glass reflector. Just below *d* is the fenestrum, *a*, through which an area of the urethra can be viewed. Fig. 2 shows the lamp, which has been unscrewed from the end; *a* is the screw, *c* and *c* the electrodes, and *d* the metallic cap. The lamp is surrounded by a material which is a non-conductor of heat, so that the urethra may not be injured. Fig. 3 represents the instrument with its obturator in place.

W. K. Otis, of New York, [245 Aug.,'94] exhibited, at the meeting of the American Association of Genito-Urinary Surgeons at Washington, an aëro-urethroscope invented by him. This instrument

consists of a hard-rubber disc, one and three-fourths inches in diameter and one-sixteenth inch in thickness, backed with metal. In the centre of this disc is a circular aperture, one-half inch in diameter, to the inferior edge of which is soldered a metal rim, one-fourth inch in depth, forming the male half of a sliding-joint by which the different sizes of urethral tubes are attached to the instrument. On the superior surface of the disc a glass diaphragm, held in a metal collar and placed at an oblique angle to prevent the reflection of light, is arranged on a pivot so as to swing over the aperture, hermetically closing it; or, when desired, instrumental applications through the tube beneath may be made



AËRO-URETHROSCOPE. (OTIS.)

by simply swinging it to the opposite direction. A slight projection on the side of this cap locks under the outer end of the metal shoulder, by means of which the illuminator is fastened to the plate in exactly the same manner as in the Klotz tube. A small metal tube extends from the edge of the plate into the movable cap. To the outer end of this tube is fastened a piece of rubber tubing, with two India-rubber bulbs, like those used in the Paquelin cautery, by means of which the urethra is inflated. Urethral tubes of any length or calibre may be used with this instrument. To prevent the escape of air from the urethra the proximal ends of the urethral tubes are made conical, so that they may be firmly wedged in the meatus urinarius; though, if the metal cap covering the glans be preferred, tubes of that pattern may be adopted. The advantages of this instrument over others designed for a similar

purpose are: 1. Extreme lightness. 2. Diminished distance between the eye and the urethral mucous membrane. 3. More ready access to the urethral field for the purpose of making direct local applications. 4. Simplicity of construction and moderate cost.

Casper [266 Sept.,'94] considers the limits and value of the urethroscope. He objects to an instrument which depends for its illumination on a lamp placed within the urethra, on account of the inflammation caused by the heat. He also considers that few pathological conditions of the deep urethra require endoscopic methods, that form of treatment being best adapted for the anterior part of the canal. In urethral infiltrations the knowledge derived from the sense of touch, as furnished by a sound or bougie, is held to be often of greater value than that furnished by the sense of sight. The author considers the urethroscope of use chiefly as an aid to diagnosis, and even here its value is limited.

BLADDER.

Fürth [317 No.14,'94] reports the result of an autopsy on a boy with a double bladder, divided into two equal cavities communicating with each other by a small opening five centimetres in diameter. The right ureter communicated with the right cavity and the left with the left one. The urachus was connected with the summit of the right cavity, the urethra with the left. The rest of the genito-urinary apparatus was normal.

J. Englisch, of Vienna, [57 Feb.25,'94] in a dissertation on vesical pouches and diverticulæ, divides these into two groups: (1) where the walls of the pouch are formed by all the structures which go to make up the vesical walls, and (2) where the vesicular muscular structures are wanting in the walls of the diverticulæ, these latter being formed, as it were, like a hernia, the mucous structures being forced through a slit in the muscular bladder-walls. When inflammation occurs in connection with these pouches, the cases are often mistaken for ones of acute pericystitis or peritonitis. Inflammations in these pouches also sometimes lead to outside suppuration, ulceration, and fistulous communications with neighboring organs.

Péron, of Paris, [7 No.13,'94] records a case of recto-vesical fistula due to cancer of the bowel in which the individual defecated by the urethra for four months. Auger [14 July 22,'94] reports a case, observed by

Lejars, of congenital recto-urethral fistula which was closed by a plastic perineal operation.

A. W. Stein, of New York, [245 July,'94] reports a case of exfoliation of the mucous and submucous coat of the bladder preceded by renal and vesical calculus. The author thoroughly reviews the literature on the subject.

E. Martin, of Philadelphia, [112 Mar.,'94] cites a case of prevesical inflammation which is of interest in that the inflammation appeared in the right inguinal region rather than in a median suprapubic position. In this instance the induration simulated a hernia.

Hunter McGuire, of Richmond, [81 Mar.,'94] advocates suprapubic drainage in painful tubercular cystitis, and reports a case where this procedure was most satisfactory. Loumeau [780 No.20,'94] and Audry [1043 Mar.,'94] also favor the same treatment in cases of this description. Wittzack, of Frankfort, [24 No.22,'94] in order to subdue the pain, employs the following solution once or twice a week: Lactate of cocaine, 1 gramme (15½ grains); lactic acid, 5 grammes (1¼ drachms); water, 5 grammes (1¼ fluidrachms). One gramme (15½ minims) of this solution is injected at a time.

Duplay [360 Sept.,'94] reviews the surgical treatment of exstrophy of the bladder, and concludes that, of all the palliative operative procedures so far advanced, that recommended first by Sonnenburg and later by Segond is the only one which meets all indications. Gilis, of Montpellier, [3 Feb.24,'94] considers the embryology of this deformity. M. Ricketts, of Cincinnati, [59 Apr.14,'94] reports a case where, by a clever plastic operation, he was enabled to relieve, in great measure, the distressing symptoms.

Stone.—W. S. Forbes, of Philadelphia, [9 June 23,'94] has made interesting experiments in one hundred and eighty-four vesical calculi to determine their measured crushing resistance and the measured strength of the lithotrite. The mechanics of the lithotrite were also studied. As a result of these experiments, the author has devised a lithotrite capable of a greater crushing power than that of the instruments at present in common use. Out of the one hundred and eighty-four stones used in the experiments, one required a pressure of four hundred and six pounds to crush it. The majority of them, however, from a general review of the statistics, seemed to break under less than one hundred pounds' pressure. Of the numerous interesting statistics we incorporate the following,

together with the cuts showing the points of weakness under great pressure developed by the different instruments :—

TABLE OF COMPARATIVE STRENGTH OF LITHOTRITES.

Kind of Lithotrite.	Size of Lithotrite, French scale.	Greatest Pressure, in lbs., from which Lithotrite would Recover Shape or Remain Operative.	Ultimate Pressure, in lbs., Required to Bend, Break, or Make Lithotrite Inoperative.	Effect of Ultimate Pressure.
Forbes	No. 33	600	650	Female shaft bent down 1¾″ from end; ends of flanges of male jaw slightly torn; instrument can be closed completely and withdrawn from bladder. (Shown in Fig. 1.)
Forbes	No. 29	484	525	Instrument this size not tested; figures were calculated, and therefore only approximate.
Bigelow with Forbes male proximal surface and V-groove	No. 26	345	358	Female shaft slightly bent down 1¾″ from end; female jaw broken through on one side of fenestrum; instrument can be closed and withdrawn from bladder. (Shown in Fig. 5.)
Bigelow	No. 33	483	495	Male jaw snapped off at top of spur with great force, flew 12 feet; locking rods in handle slightly bent; instrument can be closed and withdrawn from bladder. (Shown in Fig. 2.)
Bigelow	No. 29	381	400	Male jaw snapped off at crook with force; female jaw snapped off near top of fenestrum with force; instrument can be closed and withdrawn from bladder. (Shown in Fig. 3.)
Thompson	No. 33	449	472	Instrument this size not tested; figures were calculated, and are therefore only approximate.
Thompson fenestrated	No. 29	355	382	Female shaft badly bent down 1¾″ from end; screw-thread slightly burred; instrument cannot be closed within 1½″. (Shown in Fig. 4.)

NOTE.—The conditions of these tests were identical, and the resistance of the dynamometer was applied between the extreme ends of the jaws.

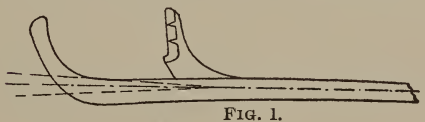


FIG. 1.

FIG. 3.

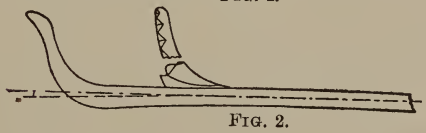


FIG. 2.

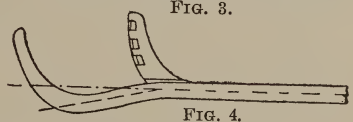


FIG. 4.

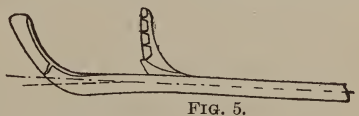


FIG. 5.

POINTS OF WEAKNESS IN LITHOTRITES. (FORBES.)

Medical News.

Surgeon-Major Keegan, $\frac{6}{\text{July 28,'94}}$ on leaving India, reports his third and last series of 64 litholapaxies on boys, with 1 death. His whole series makes 239 litholapaxies on boys, with 5 deaths.

The average weight of stone removed was 98.44 grains (6.5 grammes); average time in hospital after operation, 4.16 days; average age, 6.4 years; average rate of mortality, 2.09 per cent. The author advises a surgeon unfamiliar with the lithotrite not to try this operation on boys. He also advises, in case a trial of litholapaxy is made unsuccessfully, that the removal of the remaining mass by a cutting operation be undertaken at once, before inflammatory changes occur. Owing to the limited opportunities that surgeons in Great Britain have of familiarizing themselves with litholapaxy in the case of boys, by reason of the scarcity of such cases, Keegan states that he feels some hesitation in pressing the claims of his operation in England. Brigade-Surgeon J. Forbes Keith [1055 Oct. 1, '93] presents another communication entitled "A Further Report on the Complete Abandonment of the Cutting Operations for Removing Calculi Entire from the Bladder, and the Methods Employed instead at the Civil Hospital, Hyderabad Sindh." A former communication was noted at length in the ANNUAL for 1893, and the author's methods of perineal lithotrity for large stones quite fully described. In the present article Keith reports extremely good results with perineal lithotrity. He has done over 1000 crushings, successfully removing all *débris* without the use of the aspirator, the finely-powdered stone being entirely flushed out by repeated irrigations through a catheter. This operator, according to Keegan, has crushed more calculi than any other living surgeon. He has the wonderful record of having performed 503 litholapaxies on boys with but 4 deaths, and 106 perineal lithotrities with no deaths,—a total in children of 609 operations with 4 deaths. His general statistics are comprised in the table on opposite page, showing, by statistical figures, (1) the abandonment of the cutting operation; (2) the extension of the sphere of lithotrity; (3) the introduction of perineal lithotrity; (4) the comparative rates of mortality of the several operations.

Surgeon-Major Freyer, [2 June 16, '94] in his article on 852 operations for stone in the bladder, practically abandons cutting operations for their removal, thus indorsing Keith. Freyer has performed litholapaxy 158 times in male children with 2 deaths. The author states: "I have now practically abandoned lithotomy in my practice in favor of litholapaxy, the force of which remark will be seen when I state that amongst the last 300 cases of stone performed by

me, in patients of all ages from 2 to 90 years, the calculi weighing from 2 grains to 6⅛ ounces (0.13 to 190 grammes), there were only 6 lithotomies (1 suprapubic and 5 perineal), the modern operation having been found feasible in all the other 294 cases. In 1890 I had 106 cases of stone under my care, and they were one and all treated by litholapaxy with 1 death. With results such as these, I have not felt inclined to follow the lead of Sir Henry Thompson in his attempt to revive the operation of suprapubic lithotomy in cases of large calculi, when I could deal with them by litholapaxy; nor of his somewhat rash imitators who adopt the

	1889.			1890.			1891.			1892.			1893 (up to the end of July, 1893).			Grand Total.		
	No.	Deaths.	Percentage.	No.	Deaths.	Percentage.	No.	Deaths.	Percentage.	No.	Deaths.	Percentage.	No.	Deaths.	Percentage.	No.	Deaths.	Percentage.
Lithotomy.																		
Men	91	14	15.3	54	6	11.0	15	5	33.0	3	1	33.0	..	..	..	163	26	15.9
Children under 15 yrs.	103	2	1.9	101	1	0.9	..	..	..	..	..	..	..	..	..	204	3	1.4
Women	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	194	16	8.2	155	7	4.6	15	5	33.0	3	1	33.0	..	..	..	367	29	7.8
Lithotrity, Urethral.																		
Men	11	2	18.0	50	9	18.0	50	5	10.0	130	3	2.3	208	1	.48	449	20	4.4
Women	5	..	..	11	..	..	6	..	..	12	..	..	15	1	7.1	49	1	2.0
Children under 15 yrs.	..	..	..	..	..	..	165	2	1.2	186	2	1.0	152	..	..	503	4	0.7
Total	16	2	18.0	61	9	14.8	221	7	3.2	328	5	1.5	375	2	0.5	1001	25	2.5
Lithotrity, Perineal.																		
Men	..	..	..	..	..	..	40	2	5.0	7	1	14.0	4	..	..	51	3	5.8
Children	..	..	..	..	..	..	39	..	..	38	..	..	29	..	..	106	..	..
Total	..	..	..	..	..	..	79	2	2.5	45	1	2.2	33	..	..	157	3	1.9
Grand Total	210	18	8.5	216	16	7.4	315	14	4.4	376	7	1.8	408	2	0.5	1525	57	3.7

suprapubic operation in cases of small stone. I do not think that we can expect to improve on the results above indicated whilst we continue to extend the operation of litholapaxy to all patients coming under our care, no matter in what condition, even to apparently hopeless cases." Freyer employs the aspirator.

Surgeon-Major Dennys [6 Dec.9,'93] also reports 81 cases of litholapaxy on boys with 3 deaths. The author is enthusiastic in his advocacy of this procedure for the removal of stone in boys, and indorses the opinions of Keegan and Freyer.

G. Barling, of Birmingham, [2 May 5,'94] in the endeavor to decide the question of the comparative safety of suprapubic lithotomy, of

lateral litherotomy, and of litholapaxy in young males, has gathered statistics, taken from six London and six provincial hospitals, during the years 1888, '89, '90, '91, and '92, which follow: Suprapubic lithotomy in males under 10 years: Total, 44; recovered, 34; died, 10. From 10 to 20 years: Total, 28; recovered, 23; died, 5. Total under 20 equals 72 cases with 15 deaths. Deducting 3 deaths, this leaves 69 cases with 12 deaths,—a mortality of 17.4 per cent. The reason for this deduction is given in the text. Lateral lithotomy under 10 years: Total, 39; recovered, 37; died, 2. From 10 to 20 years: Total, 20; recovered, 20; died, *nil.* Total under 20 equals 59 cases with 2 deaths. Add 1 death from suprapubic operation after uncompleted lateral equals 60 cases with 3 deaths,—a mortality of 5 per cent. Litholapaxy in males under 10 years: Total, 43; recovered, 42; died, 1. From 10 to 20 years: Total, 16; recovered, 16; died, *nil.* Total under 20 equals 59 cases with 1 death. Add 2 deaths from suprapubic operation after uncompleted litholapaxy equals 61 cases with 3 deaths,—a mortality of 5 per cent.

The author states: "The number of cases is not as large as I could have wished, but it serves the purpose of showing the relative risk of the three operations performed under similar conditions. I am bound to say it disappointed me that the high operation should show such a high rate of mortality as 17.4 per cent. This is after deducting 3 deaths, 2 of which were in patients subjected to litholapaxy, the suprapubic operation having been performed after crushing failed; so that in the foregoing statistics it will be seen that I have credited the crushing operation with these 2 deaths. Similarly the third was in a patient on whom lateral lithotomy was attempted, but failed owing to the size of the stone, and this I have placed to the discredit of the lateral operation. Even after this correction, contrast the mortality of 17.4 per cent. with that after lateral lithotomy, which is 5 per cent., and for litholapaxy barely 5 per cent."

Barling thought it fairer to take English statistics regarding litholapaxy on boys rather than Indian ones, since surgeons in India, owing to their very extensive opportunities in this operation, become so skillful that their records are naturally better than one would expect to find elsewhere. G. Buckston Browne, [6] Oct.7,'93; Jan.6,'94 of London, and Thomas H. Aquino, assistant to Brigadier-Surgeon

J. Forbes Keith, [6 Dec.30,'93] indulge in some rather spirited correspondence. Browne criticises some of Keith's methods and statements, and considers Keith too radical in insisting on the abandonment of cutting operations. He declares that in England, at any rate, there are prostatic cases which cannot be crushed, that the Indian bladder must be more tolerant than the English, and that Keith's perineal procedure should be credited to Dolbeau. Aquino's reply is a general denial of these assertions.

G. Chismore, of San Francisco, [245 Aug.,'94] in an article on the modifications of Bigelow's operation for stone in the bladder, designed to meet cases in which the prostate is enlarged, advances the following principles, which he has found to be of advantage in his experience: 1. Substitute local for general anæsthesia in cases where an anæsthetic is required. 2. Short sittings. Continue crushing only so long as fragments can easily be found. Wash out the pieces, and stop the moment symptoms of exhaustion, spasm of the bladder, or unusual distress occur. 3. Remove remaining pieces, after symptoms due to previous operation have subsided, as soon as they can be felt by the searcher,—usually within a week,—and repeat the process until the bladder is cleared.

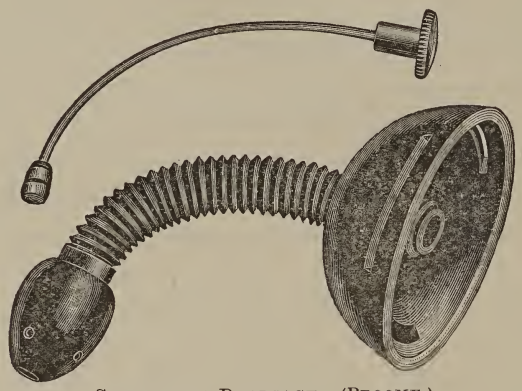
The author remarks: "It will be observed that the operation thus conducted ceases to be a litholapaxy in Bigelow's sense,—*i.e.*, the clearing the bladder at all hazards in one sitting,—and differs from a lithotrity in that all fragments small enough to pass the urethra are removed as soon as crushed."

W. T. Briggs, of Nashville, [451 Feb.,'94] records his personal experience in the treatment of stone in the bladder. In instances where the perineal operation is to be done, the author advocates the median perineal incision, combined with two lateral incisions into the sides of the prostate and vesical neck. Briggs reports having performed this operation, which he calls the "medio-bilateral," 171 times, in patients of all ages, with but 4 deaths. J. G. Kerr, of China, [235 June,'94] reports, in an article somewhat general in character, that he has done 894 operations for stone, employing various methods.

L. Ferrid [266 Sept.,'94] reports a curious instance of encysted vesical calculus, for the removal of which he found it necessary to make an incision along the sacrum. The route of the operation extended

down alongside of the rectum to the bladder, which was incised and the calculus removed. The individual died of uræmia.

Cystostomy.—Much has been written this year on this subject, especially by Continental writers. In England and America, however, where McGill's operation of prostatectomy is quite extensively practiced, the indications for cystostomy have diminished to such a degree that it naturally receives less attention than it otherwise would. In France the subject has been discussed by Poncet, $^{3}_{\text{p.561,'94}}$ Alex. Wassilieff, $^{100}_{\text{Apr.17,'94}}$ Felix Bron, $^{211}_{\text{May 6,13,'94}}$ Boutan, $^{2031}_{\text{'93}}$ Desnos, $^{31}_{\text{July 4,'94}}$ Guillemot, $^{211}_{\text{Nov.12,'93}}$ Curtellet, $^{100}_{\text{July 14,'94}}$ Audrey, $^{1088}_{\text{Oct.22,'93}}$ Rollet, $^{1043}_{\text{Nov.,'93}}$ Remy, $^{67}_{\text{Jan.15,'94}}$ and Loumeau. $^{780}_{\text{May}}$; $^{188}_{\text{Apr.8,'94}}$ These writers strive, in the main, to create a plastic urethra through which there will be no



SUPRAPUBIC DRAINAGE. (BROOME.)
St. Louis Clinique.

continuous urinary dribbling, and which will tend to remain pervious. To accomplish this the procedure generally followed is the one laid down by Poncet, which seems to be based on the same principles as that already advocated in America by Hunter McGuire, of Richmond, and R. T. Morris, of New York, and in Germany by Witzel, of Bonn, who first adopted it to make a permanent gastric fistula. The principle of the operation is to draw forward, through a narrow suprapubic opening, a portion of the lateral cut vesical walls and suture them to the external abdominal structures, thus securing a narrow passage lined with mucous and cutaneous structures which will remain pervious. The inner vesical opening is on a level considerably lower than the external abdominal one, in order to guard against constant dribbling. In

some of the successful cases, by reason of this obliquity of the canal, the urine can be perfectly retained for several hours. In Germany, Wiesinger $^{336}_{\text{No.22,'94}}$ and Martin $^{336}_{\text{No.47,'93}}$; in England, Mansell Moullin, $^{6}_{\text{June 23,'94}}$ and, in America, G. Wiley Broome, $^{786}_{\text{Feb.,'94}}$ all write on the subject. Broome drains the bladder by means of his curved hard-rubber screw apparatus, shown in the foregoing illustration, which is screwed into the suprapubic sinus and held fast. A stylet is fitted into the canal of the tube to guard against constant dribbling.

Clado, $^{17}_{\text{Mar.20,'94}}$ having in mind the process recommended by Helferich, who, in suprapubic operations on the bladder requiring

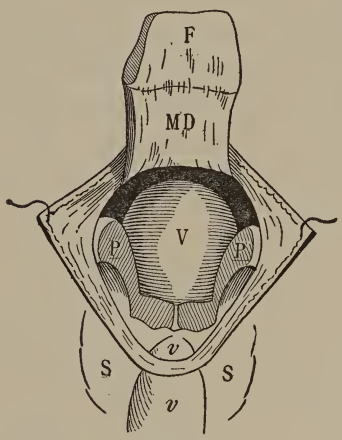


FIG. 1.

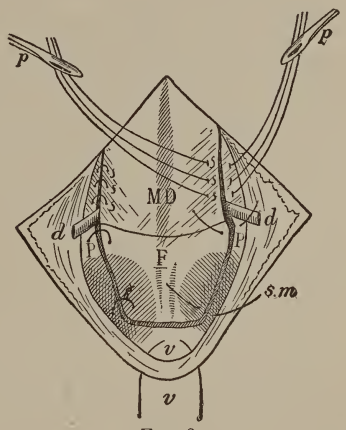


FIG. 2.

TEMPORARY RESECTION OF SYMPHYSIS PUBIS. (CLADO.)

FIG. 1.—*F*, fragment temporarily resected; *MD*, recti muscles; *P P*, undisturbed portion of the symphysis. *V*, bladder; *v v*, penis; *S S*, scrotum.

FIG. 2.—*MD*, recti muscles; *F*, resected portion in position; *P P*, pubis; *s m*, metallic sutures; *p p*, forceps holding the different ends of the threads; *d d*, drainage-tubes; *v v*, penis.

L'Union Médicale.

much space, recommended temporary resection of a portion of the symphysis pubis, presents, as a result of dissections on the cadaver, a procedure which involves a temporary partial resection of the symphysis. Figures 1 and 2 illustrate this proposed method.

Rollet $^{211}_{\text{Jan.21,'94}}$ records an instructive case in which the peritoneum was adherent to the symphysis pubis. He also reviews the literature on the subject, which contains a few similar instances. In this case, although there was vesical distension up to the umbilicus, the peritoneum still remained fast to the symphysis. On attempting suprapubic cystotomy the abdominal cavity was opened.

W. W. Keen, of Philadelphia, [144 Dec.,'93] and Pilcher, of Brooklyn, [157 June,'94] have both distended the bladder with air instead of fluid, preparatory to performing suprapubic cystotomy, and express themselves as satisfied with the procedure.

Guyon [14 Jan.10,'94] delivered an interesting lecture on symphysiotomy and presented a case in his clinic requiring this operation.

Rupture and Wounds of the Bladder.—Sieur [360 Feb.,Mar.,'94; 2 Mar.12] has written a thorough article on the surgical treatment of rupture of the bladder. He shows by statistics that, as a result of surgical intervention, the mortality from traumatic rupture of the bladder has, during the past fifteen years, been reduced from 90 to about 54 per cent. Of 18 cases of extra-peritoneal rupture treated by operation, 10 ended in recovery and 8 in death. Of 34 patients in whom the peritoneal covering of the bladder had been involved in the injury, 14 recovered after operation and 20 died. The results, it is stated, would very probably have been much better had the operation been performed at an earlier period. The author's tables show that the most serious cases are those in which the rupture of the bladder is associated with fracture of the pelvis. It is concluded from these results that surgical intervention should be practiced in every case of vesical rupture, whatever the form of the injury may be, unless there be either very intense nervous shock or the patient has been reduced to an evidently hopeless condition by urinary infiltration and general poisoning. This intervention should be prompt, particularly if the rupture be an intra-peritoneal one and complicated with fracture of the pelvis. Diagnostic difficulties, it is held, could alone justify any delay. The short stage in the course of which the surgeon can intervene with fair prospects of success, with the aim of removing the dangers of hæmorrhages and of serious urinary poisoning, is apt to be marked only by symptoms of simple contusion. The following are regarded as the most important signs of vesical rupture: a peculiar pain felt at the time of the injury; chilling of the surface of the body, which persists for some time; an urgent desire to micturate, which the patient cannot satisfy; the absence of any vesical swelling above and behind the pubes, and also the absence or the presence, but in very small quantity, of urine in the bladder. Catheterizing, though a valuable detail of investigation for determining the existence and the seat of rupture, ought not to be prac-

ticed except with very great caution. If the symptoms point clearly to intra-peritoneal rupture, median laparotomy should be performed, the bladder hermetically closed by sutures, and, if it be found necessary, the abdominal cavity drained. In cases of extra-peritoneal rupture the surgeon has the choice of suprapubic incision, of the incisions of Trendelenburg and Helferich, and of symphysiotomy. In cases in which there is doubt as to the seat of the rupture, the surgeon should begin by making a vertical incision of the abdominal wall. In every case he ought to respect, as far as possible, the peritoneum, which membrane should not be opened unless there be good grounds for doubt as to the integrity of the abdominal viscera. Even in cases of extra-peritoneal rupture suture of the vesical wound should be attempted in preference to drainage. For purposes of drainage the surgeon should confine himself, in most instances, to an incision above the pubes, and incise the perineum only in cases of extravasation and of injury near the neck of the bladder. If the vesical wound cannot be closed by stitches, the bladder should be drained by a siphon-tube and by a retained catheter. Retention of an instrument in the bladder ought always to be preferred to intermittent catheterism.

Joseph Coats, of Glasgow, $\frac{2}{\text{July } 21,'94}$ reports two cases of uncomplicated intra-peritoneal rupture of the bladder, the existence of which lesion was not suspected during life in either of the cases. A general post-mortem showed such a condition to be the only pathological feature in both instances. There was no clear history of any violence. One of the individuals was acutely maniacal and the other intoxicated. In both cases the rupture was situated on the posterior wall. There were no signs of acute peritonitis in either case. The individuals lived probably five and three days respectively after the accident. The author thinks the mode of death in these cases to be directly related to the absorption of the urine by the peritoneum and to its continuous accumulation in the blood. Sterile aseptic urine in these instances (probably in all instances) did not cause peritonitis or inflammatory changes in connection with the vesical rent.

J. Kerr, of Washington, D. C., $\frac{96}{\text{Dec.},'93}$ reports a case of intra-peritoneal rupture of the bladder, upon which he performed a successful laparotomy, sewing up the rent. He first made a

suprapubic cut down into the bladder, which he found collapsed, and extended the original incision upward, opening the peritoneal cavity, the patient being placed in the Trendelenburg position. The tear was then brought into view and sewed up. A drainage-tube was inserted in the bladder through the suprapubic incision. A tampon of iodoform gauze was left in the abdomen behind the bladder after the operation. This case was complicated by a fracture of the pelvis. The patient was 33 years old, and left the hospital one month after admission.

J. Fischer $\frac{84}{\text{Nos.9,10,'94}}$ reports two cases under the care of Weinlechner, of Vienna, of recto-vesical fistulæ caused by splinters of wood penetrating the parts. These wounds healed spontaneously in a short time. T. Myles, of Dublin, $\frac{22}{\text{Dec.6,'93}}$ and R. Douglas, of Nashville, $\frac{86}{\text{Jan.,'94}}$ each report a similar case. Both wounds healed kindly with little difficulty. T. N. Ghose $\frac{239}{\text{Dec,16,'93}}$ reports a case of calculus the nucleus of which consisted of a piece of wood. There was a history of a penetrating vesical injury some time previously. The wound in the bladder, however, had healed spontaneously. Heusgen $\frac{69}{\text{No.25,'93}}$ also reports the spontaneous cure of a recto-vesical tear.

Tumors.—Von Frisch, $\frac{57}{\text{Feb.4,'94}}$ after a review of the literature, reports 14 personal cases,—7 of papilloma, 6 carcinoma, and 1 adenoma. All had been subjected to operation and none had died. Suprapubic cystotomy had been resorted to in all except two instances. In one carcinomatous case the posterior part of the bladder with the vagina was removed, and in another similar case the growth was removed through the rectum. The author does not favor the resection of the symphysis pubis. Kümmell $\frac{475}{\text{H.59}}$ writes on the prognosis and treatment of tumors of the bladder. Southam, of Manchester, $\frac{2}{\text{July 20,'94}}$ reports two interesting cases of vesical sarcoma in children. Symonds, of London, $\frac{2}{\text{Apr.21,'94}}$ describes a case of squamous-celled carcinoma of the bladder which, before death, destroyed the prostatic urethra and invaded the whole canal even to the meatus. It also extended upward to the left kidney. Guyon $\frac{100}{\text{June 28,'94}}$ delivered an instructive lecture on the disturbances of micturition due to tumors of the bladder. Verhoogen, of Brussels, $\frac{868}{\text{June 16,'94}}$ reports an extremely interesting case of fibroid tumor of the vesical wall. The growth was the size of a baby's head and attached by a pedicle of three fingers' breadth to the lower posterior

wall of the bladder. Its structure was the same as a uterine myoma. Heger regarded the growth as arising from the residual organ constituted in the male by the duct of Müller being imperfectly atrophied.

Clado, of Paris, $^{360}_{\text{Sept.,'94}}$ thoroughly reviews the literature on the subject of resection of the bladder for the removal of tumors, and also considers the question of urethral grafting. R. F. Weir, of New York, $^{59}_{\text{Aug.11,'94}}$ successfully resected an infiltrating vesical carcinoma which involved the upper posterior portion of the bladder.

FIG. 1.—DIAGNOSIS OF CALCULUS. (FENWICK.)
British Medical Journal.

F. Legueu, of Paris, $^{7}_{\text{Nov.8,'94}}$ likewise successfully removed a similar growth involving the summit and anterior portion of the bladder. E. Hurry Fenwick, of London, $^{2}_{\text{Apr.7,'94}}$ mentions a case of recurrent vesical epithelioma which he successfully removed by resection.

New Instruments and Procedures.—E. Hurry Fenwick, $^{2}_{\text{Apr.21,'94}}$ in order to demonstrate the presence of a calculus in a deep post-prostatic pouch, advocates plunging in a long trocar and cannula through the suprapubic region, as shown in Fig. 1, and touching the stone. In order to illuminate the bladder, in a case of this

description, he calls attention to a suprapubic electric cystoscope, the construction of which, together with the method of use, can be seen from Fig. 2.

G. Frank Lydston, of Chicago, $^{245}_{\text{Aug.,'94}}$ suggests, as a simple device to facilitate micturition, in patients with artificial suprapubic urethræ, the fitting over the suprapubic opening, at the time of micturition, of a small glass funnel which directs the stream away from the body. B. H. Daggett, of Buffalo, $^{170}_{\text{July,'94}}$ presents a cannula which is apparently much like the Keefer nozzle, through which

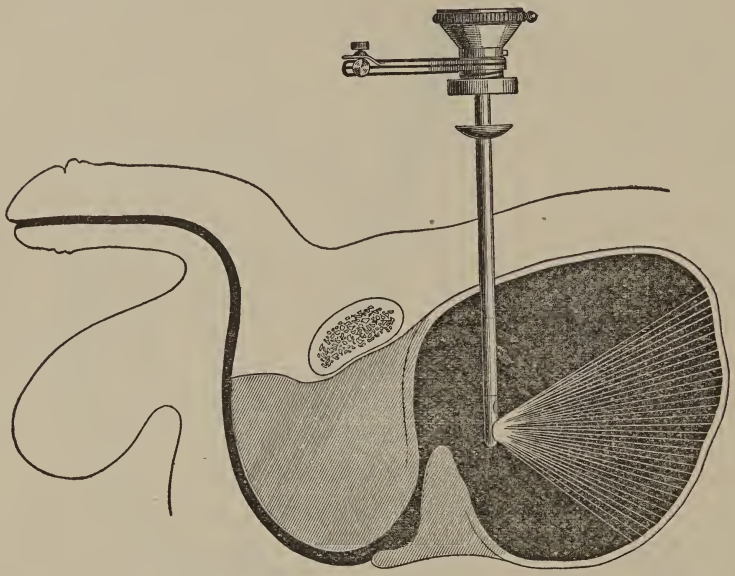


FIG. 2.—ELECTRIC CYSTOSCOPE. (FENWICK.)
British Medical Journal.

he successfully irrigates the bladder without the aid of a catheter. He reports good results with irrigations of 115° F. (46.2° C.) by this method.

Boisseau du Rocher $^{720}_{\text{Jan.,'94}}$ presents a new cystoscope, illustrated on the opposite page. The light is in the end. There are two windows, *F* and *F'*,—one on the concave and one on the convex surface; corresponding to these two windows are the openings *B* and *A*. *M* is the stylet. When the stylet is withdrawn the optical cylinders *O* and *O'* can be alternately introduced. In *O* the prism is arranged to look out at *B*. In *O'* it is arranged to look out at *A*.

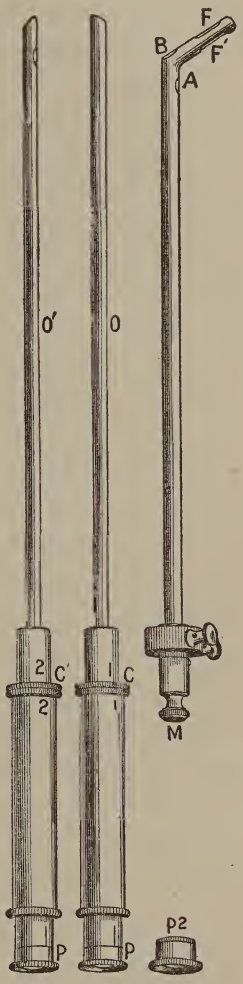
P and *P'* are the eye-pieces. One of the chief advantages claimed for this instrument is that by a slight motion of the main shaft all parts of the interior of the bladder can be brought into view through the use of the two optical cylinders and the double windows.

PROSTATE.

Prostatectomy by McGill's Method.—A. W. Mayo Robson, of Leeds, [26 Sept.,'94] reports twelve cases of this operation with two deaths. The results in those cases that recovered were apparently very satisfactory, the urine being generally passed naturally. Robson makes no perineal cut for drainage in that direction. The suprapubic drainage-tube is removed, if possible, on the third day, and the patient is allowed to sit up within a few days of the operation.

Angus McKinnon, of Guelph, Ontario, [39 June,'94] reports three cases, all of which recovered. His third case, however, from the history, would hardly seem to properly come under this heading, as there is no account given of the removal of the prostatic obstruction, and a suprapubic fistula has to be permanently maintained.

Nicoll's Method of Excising the Prostate.—James H. Nicoll, of Glasgow, [6 Apr.14,'94] in order to obviate lacerations and tears of the mucous membrane of the vesical neck and deep urethra, recommends the following procedure in the removal of the prostate: He makes a suprapubic cut into the bladder and stitches the lateral cut walls of the bladder to the corresponding sides of the abdominal incision. He then makes a median and perineal cut down to and through the prostatic capsule without cutting into the urethra or vesical neck. With one hand in the suprapubic wound he



CYSTOSCOPE. (DU ROCHER.)
Revue Inter. de l'Electrothérapie.

presses down the prostatic growth so that it is steadied and brought into reach of the forefinger of the other hand introduced through the median cut. By this means the perineal finger gradually shells out the growth.

If the growth is too fine and fibrous to be removed by the finger, then an instrument much like a periosteum-scraper does the work. In case the median incision does not give room enough in the region of the prostate, lateral incisions can be made much as in von Dittel's procedure. The hand in the bladder can detect when all the obstruction has been removed.

Mansell Moullin [6 Apr.21,'94] considers the question whether atrophy of the enlarged prostate can be induced by a partial removal of the gland, and states that if the gland has passed into the stage of fibroid induration nothing short of a radical removal of the whole obstructing portion can be done in order to effect a satisfactory cure. He also observes that the instances in which such atrophy has taken place have been congestive or inflammatory in character.

W. T. Belfield, of Chicago, [56 Aug.,'94] briefly reviews the diagnosis and treatment of prostatic enlargement.

Bier's Method of Inducing Atrophy of the Hypertrophied Prostate by Simultaneous Ligation of Both Internal Iliac Arteries.—W. Meyer, of New York, [96 July,'94] adopted this severe procedure in one case of retention from prostatic hypertrophy. The patient survived, though threatened by death from secondary hæmorrhage and gangrene of a portion of one foot. After recovery there was some apparent diminution in the size of the prostate, and some urine could be voided naturally. After the urinary act, however, there remained from 10 to 24 ounces (310 to 750 grammes) of residuum. Meyer expresses himself as extremely encouraged by the result. It is difficult, however, after reading the history of the case, to feel as the author does regarding it.

Castration for Hypertrophy of the Prostate.—Francis L. Haynes, of Los Angeles, Cal., [170 Mar.,'94] following the suggestions contained in J. William White's paper of last year, has performed double castration in the cases of three old men suffering from prostatic hypertrophy, with the following results:—

"1. Operation eighty-four days ago, in a case of two years' standing, of moderate severity. The patient is practically cured.

"2. Operation forty-seven days ago, in a desperate case, requiring catheterization every two hours, complicated by intense cystitis and by morphinism acquired as a result of frightful suffering. With the most devoted nursing, this old man has improved wonderfully. Cystitis has disappeared; one-third of the urine is passed spontaneously; catheter is used every four or five hours; morphinism has been cured; general condition good.

"3. Operation fourteen days ago. Incipient case; catheterization almost impossible because of the peculiar development of the prostate.

"In a fourth case section of the vas deferens gave no definite results."

Ramm, of Christiania, $\frac{336}{\text{Apr.28,'94}}$ reports more fully the two cases of double castration, mention of which was made last year. His final report is as follows:—

"1. Man, aged 73 years, who suffered from retention of urine in the early part of 1893, had difficulty in making water for the previous fifteen years. During the last year he passed water almost hourly. The prostate, as felt per rectum, was about as large as a medium-sized orange. On April 3, 1893, bilateral castration was performed. Twelve days afterward he was shown before the Medical Society at Christiania. Three days after operation the prostate was distinctly smaller, and it has since steadily diminished, being now a flat mass. After the operation and during the first two months the catheter was passed three or four times to relieve temporary retention. Now he passes water as well as he ever used to, and has only to empty his bladder twice during the night.

"2. Man, aged 67½ years, who six years ago (1886) had retention, had suffered for fourteen years from difficulty in making water. A year ago (1892) he again suffered from retention, and the bladder was punctured above the pubes; cystitis occurred and soon became chronic. On April 17, 1893, the prostate was very large, and its upper border could only just be reached by the finger in the rectum; the bladder was distended, reaching near to the umbilicus. After much trouble the urine was withdrawn by a catheter. On April 25, 1893, bilateral castration was performed. During the night following the operation he passed a good stream of urine, and on May 6th (eleven days after the

castration) the prostate was distinctly diminished. About the end of May—that is to say, six weeks after the operation—he could stand up and pass a good stream of urine. At the present time the prostate, which was so large, is a small flat mass with a median ridge in the position of the urethra. He now passes water four or five times only during the day and once only at night, all the difficulty in making water and the cystitis having completely disappeared."

Ramm concludes with the following remarks:—

"1. The prostate is one of the genital glands.

"2. It attains its full size after or during the acquirement of the sexual function.

"3. In failure of development of the genital organs (testes) it remains small, as it does after castration before the onset of puberty.

"4. Castration (bilateral) causes in the adult atrophy or shrinking of the gland.

"5. The hypertrophied prostate shrinks after bilateral castration; some days after castration there occurs some diminution in the size of the gland, and this goes on steadily for some time.

"6. This diminution of the enlarged prostate after castration can be made use of in the treatment of difficulty in making water resulting from mechanical interference with the urethra from the simple enlargement of the gland."

F. Fremont Smith, of St. Augustine, Fla., $\frac{96}{\text{July,'94}}$ at the suggestion of J. William White, performed this operation January 17th in a case suffering from acute cystitis and septic fever due to retention of urine from hypertrophy of the prostate. The following is the history of this case: During the week following operation the patient was catheterized twice daily; at the end of that period he attempted and successfully voided his urine, and the catheter was used twice each week, alone for the purpose of determining the quantity of residual urine. No local treatment was employed subsequent to operation. On March 1st, six weeks after operation, the patient was discharged. His general conditions were changed, in that subsequent to castration there was no fever from any source, the appetite returned, the weight increased from 135 to 163 pounds (61 to 74 kilogrammes), and the mental state, previously weak and melancholic, decidedly improved. His local

conditions were changed in that, instead of retention or residual urine of not less than 6 ounces (186 grammes), there was no retention or return of acute cystitis, and the residual quantity steadily diminished, during the final week varying between 3 and 1½ drachms (12 and 6 grammes). The nocturnal desire for urination was reduced from twelve and fifteen to four and six times. The urine then presented a sediment only on standing for hours, which contained, under the microscope, a moderate number of pus-cells.

Mansell Moullin, of London, [22 Sept.18,'94] has tried this procedure in one instance with very gratifying results. Sinitzine, of Moscow, [31 May 5,'94] also reports a case of this nature, in which all trace of hypertrophy had apparently disappeared after several months.

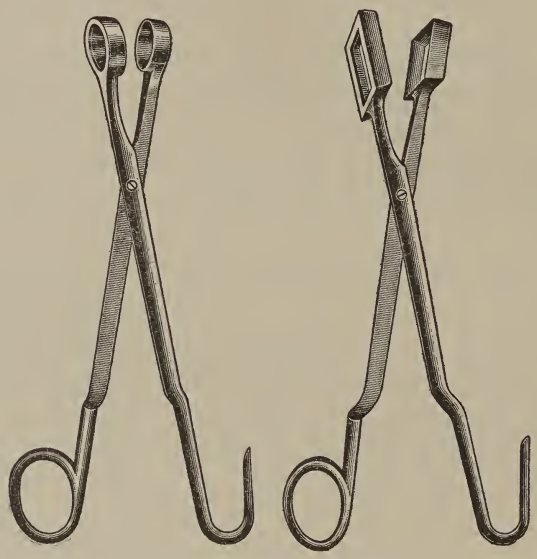
J. William White, of Philadelphia, [2 June 23,'94; 80 July 16] publishes a digest of the literature on the subject of castration for prostatic hypertrophy. [White and Ramm independently, and apparently without each other's knowledge, have simultaneously investigated this subject. White was first to publish his experiments on animals and to suggest the possibility that double castration might be of value in cases of prostatic hypertrophy. Ramm was the first, after making experiments on animals, to put the results of his experiments to a practical test, by performing double castration on two old men. The procedure is as yet in its experimental stage.]

Miscellaneous.—A. Freudenberg [319 No.26,'93] uses the ammonium preparation of ichthyol, in the doses of 7 to 15 grains (0.50 to 1 gramme) in a suppository, in subacute and chronic cases of prostatitis. One such suppository is used twice a day. By this treatment the subjective symptoms were speedily relieved. Scharff, [24 No.19,'94] in forty similar cases, obtained good results from rectal injections of a syringeful, three or four times a day, of a 10-per-cent. solution of ichthyol.

Legueu [266 Dec.,'93] records the case of a pediculated tumor of the prostate gland removed by Guyon. Dufour [7 No.11,'94] describes a case of primary cancer of the prostate. J. H. Dunn, of Minneapolis, [96 Apr.,'94] reports a case of ossifying enchondroma of the pelvis which simulated prostatic hypertrophy.

Thomas Jessop, of Leeds, [2 Dec.9,'93] has invented an instrument which he calls prostate scissors. The scissors has a ring at the end of each blade. The smaller ring is made with a cutting-edge

and fits exactly into the circle of the larger one, the edge of which is also sharp. The diameter of the rings in each of the three sizes made measures $\frac{7}{8}$, $\frac{9}{16}$, and $\frac{3}{8}$ inch. In performing suprapubic prostatectomy the blades of the scissors are passed into the bladder and the projecting lobe of the prostate snipped away either at once or piecemeal. The illustration shows two patterns of this instrument.



PROSTATE SCISSORS. (JESSOP.)
British Medical Journal.

URETERS.

Anomalies.—Ardin-Delteil, of Montpellier, $\frac{31}{\text{June 6,'94}}$ records a case of double ureter in connection with one kidney. These two ureters were perfectly separate throughout, and had separate communications with the bladder.

Grafting of the Ureters.—Adolfo Schwarz, $\frac{599}{\text{July 3,4,5,'94}}$; $\frac{2}{\text{Sept.15,'94}}$ of Padua, after reviewing what has been accomplished in a general way in grafting of the ureters, shows by numerous experiments that it is possible and practicable to remove the bladder, dissect out the ureteral orifices, and then graft these orifices to the urethra. Using large bitches, which are more suitable than dogs by reason of the simple course of their urethræ, he has succeeded in so grafting the ureters into the urethra, after removing the bladder,

that the animal recovers from the operation without the least interference with its renal functions. His results go farther, for, after allowing the animals to live for some months, he has found, on killing them, that the inner end of the urethra has so expanded and hypertrophied that it forms an organ which fulfills all the functions of a reservoir for the urine. The technique of the operation is, briefly, as follows: The animal being profoundly narcotized by morphine, an incision is made in the linea alba, immediately above the symphysis pubis, each layer of the abdominal walls, and finally the peritoneum, being divided separately. The bladder is then emptied by compression, and the vesico-umbilical and two lateral ligaments are divided, after isolation of a good length of the ureters. These are next divided as close as possible to the bladder and withdrawn from the wound, after which the bladder, its cervix, and as much as possible of the urethra are pulled forward. The bladder is now separated from the commencement of the urethra, and a short length of gum-elastic catheter is passed through the lumen of the urethra to the outside. This tube is destined to remain *in situ* for three or four days, and allows a free passage for the urine. The ureters are then implanted separately into the ureter through two separate incisions on the right and left upper portions of its wall, being held in position by specially-arranged stitches. The next stage of the operation is to close the open end of the ureter, so as to prevent the escape of urine into the abdominal cavity. This is done by a Lembert suture, the urethra, with the ingrafted ureters, being returned into the abdomen, and the wound closed layer by layer. No external dressing is applied, but the catheter is cut off short externally and fixed in position by one or two sutures. The animal is also prevented from touching the wound for the first three or four days; in fact, until the catheter is withdrawn. As the result of the operation there is complete incontinence for several days, but after about a fortnight the animal begins to make voluntary attempts to micturate, and, as time goes on, acquires a considerable power of retaining urine. The animals thus operated upon for the most part made a complete recovery, and when at length they were killed they were almost completely continent. The post-mortem examination revealed the fact that a new organ had developed, possessing all the characteristics of the original

bladder, and capable of fulfilling all its functions. A sphincter is also provided to the new bladder, as a result of an hyperplasia of the striped muscular fibres of the upper part of the urethra; in fact, the new bladder is almost indistinguishable histologically from the organ removed.

Chaput [360 Jan.,'94; 96 Aug.] also contributes a valuable article on the grafting of the ureters to the intestine, which he considers a feasible operation in man, reporting a most successful case. In speaking of the poor success which had attended experimental operations of this nature on dogs, Chaput says: "I believe that the difficulty is due in part to the very small size of the ureter in the dog, and in part to the great rigidity of the intestinal walls, causing the sutures to cut through the tissues and rendering union almost impossible." Chaput tried the operation in the cases of two women. In the first—a brilliant success—there existed a uretero-vaginal fistula after hysterectomy. The abdominal cavity was opened, the intestines parted to one side, the posterior layer of the peritoneum divided, and the ureter exposed. The renal portion of the divided ureter was made to meet the colon on its posterior and lateral aspect at a very acute angle. A row of sutures was inserted uniting the serous layers of the two structures along the posterior semi-circumference. The intestine was then incised in a direction corresponding to the ureteral orifice, and a corresponding row of sutures uniting the mucous layers was placed in position. The interior diameter of the ureter was about eight millimetres, and from three to five sutures were placed in each row. The anterior lips were then brought into close apposition by two similar lines of sutures,—the first in the mucous, the second in the serous layers. The vesical end of the ureter was then ligatured. At the end of a year the patient was in good condition, having three watery stools a day. The second case was one of vesical tuberculosis. Here the attempt was made to divert the urine from both ureters, by separate operations, into the colon. Although the ureters were both thickened by tubercular infiltration, the first operation, undertaken in connection with the left ureter, was successful. The patient, however, died after the operation, undertaken three months later, in connection with the right ureter.

Weller Van Hook, of Chicago, [61 Dec.16,23,'93] in an interesting article on surgery of the ureters, advocates a clever plastic operation for

certain injuries to them in their vesical portions. This procedure consists in cutting out of the bladder a parallel strip of the wall about fifteen centimetres wide, and of sufficient length to reach the renal end of the ureter. This strip is cut free at its lower end and turned back and fastened to the slit-up end of the ureter. Its edges are then sewed together, making a funnel, and the cut walls of the bladder are sutured in apposition. The author also describes, in detail, his well-known procedure for splicing a transversely-divided ureter. The cuts, however, already inserted, of this same operation, as applied to the vas deferens, illustrate it sufficiently to require no further mention here. (See page E–21.) The ureter is so elastic that this operation is feasible even though there should be a loss of substance of the ureter equivalent to an inch. Van Hook is not an advocate of intestinal grafts under any circumstances, or, in fact, of any grafts, except vesical ones, where it is possible to splice the ureteral canal. He believes the extra-pelvic portion of the ureter to be most safely reached by retroperitoneal incisions, and that such should be the operation except in those cases where the necessity for a plastic procedure occurs during a laparotomy. The intra-pelvic portion of the ureter, he thinks, can be reached by an incision through the abdomen, the bladder, the rectum, the vagina, the perineum in the male, or by Kraske's method.

Christian Fenger, of Chicago, $^{96}_{\text{Sept.,'94}}$ presents the most thorough and classical digest on the surgery of the ureter which has as yet appeared. The author's successful method of treating stricture of the ureter and valve formations at the junction of the kidney-pelvis and ureter was noticed in last year's ANNUAL. Fenger, although objecting to bowel-grafts on account of the infection which is so likely to follow, still does not absolutely condemn the procedure, as does Van Hook. The operative procedures advocated in order to expose the ureter at the different parts of its course are the same as those recommended by Van Hook.

Herman Mynter, of Buffalo, $^{96}_{\text{Dec.,'93}}$ reports a case of acute intermittent hydronephrosis from valvular stricture of the ureter at its junction with the kidney-pelvis. This case is similar to the one reported last year by Fenger, and the operation employed is also similar. The pelvis of the kidney was opened and the valve, on being exposed, was cut through transversely by a longitudinal

incision. The ends of the longitudinal incision were then drawn together by sutures, thus folding each lateral cut on itself. Several sutures were also employed to maintain this position, which entirely obliterated the valve. A cure of the hydronephrosis resulted.

Bloodgood $^{96}_{\text{Jan.,'94}}$ has successfully repeated Van Hook's experiments, which consisted of splicing the transversely-divided ureter. H. A. Kelly, of Baltimore, $^{96}_{\text{Jan.,'94}}$ is the first one to put this experimental procedure of Van Hook's to a successful practical use. In the course of an hysteromyomectomy he accidentally divided transversely the right ureter. The cut ends were spliced and a perfect recovery ensued.

C. B. Penrose, of Philadelphia, $^{9}_{\text{Apr.28,'94}}$ by this same procedure of Van Hook's, successfully implanted into the bladder the renal end of a ureter, which was resected during an operation for a cancer of the broad ligament. R. Abbe, of New York, $^{96}_{\text{Aug.,'94}}$ successfully transplanted the renal end of a ureter into a foul vesical pouch. The graft not only took, but the new position of the ureter, by washing out the pouch, served to purify it. Bazy, of Paris, $^{14}_{\text{Nov.8,'93}}$ in a general article advocates, in all possible cases where urinary fistulæ exist, the grafting of the ureter to the bladder rather than nephrectomy.

Uretero-Lithotomy.—E. Cotterell, of London, $^{2}_{\text{May 12,'94}}$ reports two such cases. In the first the calculus, which was impacted just below the rim of the pelvis, was reached by an incision similar to the one employed in tying the common iliac artery. The ureter was then incised longitudinally and the stone removed. In the second case the stone was removed by an incision through the upper vaginal wall. Both operations were successful, the patients recovering. The same author, $^{6}_{\text{June 30,'94}}$ in a general article on the subject of stone impacted in the ureter, considers the consequences, symptoms, diagnosis, and treatment of this condition.

Traumatic Rupture of the Ureter.—Herbert W. Page, of London, $^{96}_{\text{May,'94}}$ makes a careful study of subcutaneous wounds or ruptures of the ureter. He has collected from the literature ten such cases, besides reporting one of his own. His case was that of a child 5 years old, in which the ureter was injured by the wheel of a light wagon passing over the abdomen. In this case there were no special symptoms pointing to the severity of the in-

jury sustained for twenty days after the accident. Nephrectomy was finally performed, a suppurating kidney being discovered. The child recovered.

Rochet, of Lyons, [100 Dec.23,'93] calls attention to the frequency with which death by uræmia follows the removal of tumors which compress the ureters, and studies the operative indications in this class of cases.

KIDNEY.

General Articles.—James Israel, of Berlin, [226 B.47,H.2] publishes his experiences in renal surgery from 1882 to 1893. The principal conclusions arrived at by this author were, however, recorded in the ANNUAL for 1894. Greiffenhagen, of St. Petersburg, [21 Feb.17,'94] mentions nine personal cases representing various renal operations, and comments on the recent literature in connection with each. Aldibert, of Paris, [118 Oct.,Nov.,'93] thoroughly reviews the subject of renal surgery in children.

Anuria.—Demons and Pousson [266 Feb.,'94] discuss operative interference in calculous anuria, collecting fifteen such cases from literature and adding three personal cases. Of these eighteen cases six died. The authors conclude that calculous anuria indicates operation as urgently as does intestinal obstruction. The calculus must not be attacked, however, from in front. The uncertainty regarding the exact location of the obstruction contra-indicates this course. The creation of a means of escape for the urine above the obstruction greatly enlarges the field of action. Access to the renal pelvis is to be obtained by an incision through the convexity of the kidney. This operation, being so simple and free from danger, is to be preferred to ureterotomy or pyelotomy, unless the location of the calculus has been accurately determined. Calculi are usually arrested at the mouth of the ureter or at its upper extremity. In this way nephrotomy often becomes curative, as it permits of the extraction of the offending calculi, either directly or by pushing from below upward or from above downward, or by retrograde catheterism of the ureter. Delay in resorting to operative procedures accounts for much of the fatality in these cases.

Legueu [827 July 25,'94] reports a case of calculous anuria which had existed for five days, at the end of which time nephrotomy was performed, the renal pelvis exposed, and a calculus plugging the ureter removed. Recovery with healing of the wound by first

intention ensued. Wheelton Hind, of Staffordshire, $_{\text{May 5,'94}}^{2}$ records a case of total suppression of urine due to impacted calculus with atrophy of the other kidney from a previous similar condition. Nephrotomy was performed after the anuria had existed six days, and a stone weighing 6 grains (0.39 gramme), which blocked the commencement of the right ureter, was removed. After the operation the patient rallied and passed urine from the bladder as well as from the wound, but died at the end of fifty-eight hours from heart-failure. Jouon and Vignard $_{\text{Aug.,'94}}^{1043}$ report one of these cases. Nephrotomy was performed and a stone removed. After the removal of the calculus, however, no probe could be passed along the ureter into the bladder, there being some obstruction still remaining. The lumbar wound, consequently, did not close. Bland Sutton $_{\text{July 11,'94}}^{22}$ also reports a case in which nephrotomy was performed on the fifth day of complete suppression and a stone plugging the entrance of the right ureter removed. A free flow of urine followed immediately after the operation.

Hydronephrosis.—Tuffier $_{\text{Jan.,'94}}^{266}$ has made numerous valuable experiments on dogs, which go to prove his theory that intermittent hydronephrosis is almost always connected with a movable condition of the kidney. He rendered the kidney movable in dogs, and then fixed it in an abnormal situation. In four instances hydronephrosis resulted, and this proportion was about the same as was observed clinically. This hydronephrosis was accompanied by the formation of a sharp bend in the ureter at the point where it crossed the vessels, about two-thirds of an inch below the hilum of the kidney. Simple compression of the kidney was sufficient to cause the urine to overcome the impediment offered by this bend, which could be straightened out, when the hydronephrosis would disappear at once. Anatomical facts observed in the course of operations also spoke in favor of the same mechanism. In two patients the author had distinctly observed the bend in the course of an operation, and in a third he had observed, at a point about an inch below the hilum, a sudden change of calibre in the ureter, indicating that there had been a folding at that point. This bend could be made to disappear by a change in the attitude of the person.

A case of movable kidney in a woman is also cited, in which the individual perceived that her flank increased in volume and

became painful when she remained standing, but that as soon as she lay down and raised her hips decidedly the swelling disappeared and she felt herself relieved and passed water copiously.

Tuffier advocates nephrorrhaphy in the treatment of these cases, which operation, by fixing the kidney securely in its proper position, eliminates the ureteral obstruction, thus allowing a cure to gradually take place. The author has operated successfully in this way on nine cases.

Henry Morris [6 Jan.27,'94] performed double lumbar nephrotomy for congenital hydronephrosis, operating at the twenty-second hour after birth. The child, several weeks after the operation, was still living and passing all its urine through the lumbar fistulæ. It was impossible to state what was the cause of the hydronephrosis in this boy; whether it was a contraction of the ureter after the passage of a stone or the lodgment of a calculus in the tube.

Adler, of Berlin, [69 Feb.15,'94] reports the case of a child, 3½ years old, which had an enormous swelling of the abdomen, due to a congenital hydronephrosis of the left kidney. The wall of the sac, after being sutured to the abdomen, was incised and drained. Later on, the right kidney appearing to be sound, Israel removed the diseased organ. The final operation was successful, and the child improved in general health.

E. Martin, of Geneva, [197 July 20,'94] in a similar case, successfully removed from a child 2 years old, by the lumbar route, an enormous congenital hydronephrotic kidney. In this case the tumor was first noticed when the child was 6 months old. The nature of the cystic mass had been ascertained before the radical operation by means of tapping.

Witzel [336 Nov.25,'93] advocates, in the operative treatment of hydronephrosis, the formation of a long oblique fistula resembling that developed in his method of gastrostomy and of cystostomy. The extirpation of a large renal sac is regarded as a very serious operation, and, on the other hand, the formation of a direct fistula, in cases in which some portion of the secreting tissue of the kidney is preserved, is likely to be followed by disagreeable results, resembling those caused by a vesical fistula. A case is reported in which an oblique fistula was successfully established in a woman suffering from a very large renal cyst on the left side. J. Bland Sutton, [1077 Nov.15,'93] advocates nephrectomy for hydronephrosis.

Nephrolithotomy.—Tuffier [100 Jan.27,'94] records a case of this description where he successfully prevented renal hæmorrhage by compression of the pedicle of the kidney during the operation in the following manner: Before the kidney is incised the pedicle is exposed and compressed between the thumb and forefinger of an assistant, or between the blades of an especially-devised pair of forceps. The kidney is incised, the stone removed, and the cut renal edges brought into apposition by catgut sutures. The compression is now removed from the pedicle and very little bleeding results. In the case reported the lumbar incision was also closed by three layers of catgut and Florentine gut sutures, there being no drainage. The patient speedily recovered. Before doing this operation the author had experimented successfully with this method of temporarily arresting renal hæmorrhage.

James Bell, of Montreal, [245 Dec.,'93] has successfully performed double nephrolithotomy.

E. Hurry Fenwick, of London, [1077 Jan.31,'94] writes on the clinical distinctions between stones imbedded in the renal substance and those loose within the pelvis, and records a number of cases by way of illustration. He remarks, "It is obvious, on reflection, that the symptoms caused by renal stones and the destruction they are able to produce must, of necessity, depend upon their situation. If they are inclosed in a cavity like the renal pelvis, sheathed, as that receptacle is, with sensitive mucous membrane, they must sooner or later irritate and inflame that surface, whilst their weight will cause them, from time to time, to fall upon the mouth of the ureter and produce those backward-pressure changes which prove so fatal to the working capacity of the gland. On the other hand, if they are fixed in a deep calyx or are imbedded in the tolerant renal substance, their capacity for producing symptoms or for causing permanent and extensive damage is much curtailed."

Resection of the Kidney.—M. Stamm, of Fremont, Ohio, [185 June,'94] following largely the methods of Kümmel and Tuffier, successfully resected an ounce of renal tissue which had become disorganized by reason of a traumatism. The author gives a thorough *résumé* of the literature on the subject.

Nephrectomy by Pieces (par Morcellement).—Tuffier, [266 June,'94] admits having obtained his idea of this operation from a procedure adopted in certain cases by Péan. He was also stimulated in his

investigations by the success of Ollier with subcapsular nephrectomy, which was mentioned in the last ANNUAL. The procedure is advocated in sclerous degenerations of the kidney, such as hydronephrosis, pyonephrosis, and chronic inflammatory conditions generally, where the organ is enlarged and bound down by perirenal adhesions with or without abscess formation, and especially in instances where a nephrectomy secondary to a nephrotomy is demanded. A lumbar incision is made, and the lower portion of the kidney is exposed and removed bit by bit till the hilum is reached and the vessels of the pedicle secured. By this procedure the neighboring structures are not at all disturbed, sufficient space for the operation being secured through the hole made by the removal of the kidney-pieces. The author reports a case in which there existed twelve purulent intra-renal foci, and which he cured by this method.

F. Page, of Newcastle, Eng., $^{6}_{\text{Nov.11,'93}}$ reports four interesting cases of nephrectomy, three of which recovered.

Lipoma.—Bobrow $^{336}_{\text{Mar.31,'94}}$ records a case of diffuse renal lipoma. Selter, $^{20}_{\text{B.134,p.199}}$ basing his opinion on the study of two cases, concludes that true lipomata are found only in the cortical portion of the kidney, where they form little nodules the size of a cherry. These lipomata are heteroplastic and do not develop from the parenchyma.

Malignant Renal Growths in Children.—Robert Abbe, of New York, $^{96}_{\text{Jan.,'94}}$ reports two cases of sarcoma of the kidney in children successfully operated on. One child, 2 years old at the time of the nephrectomy, was well one and one-half years afterward. The other, 1 year and 2 months old at the time of the nephrectomy, was well one year afterward. Dodelein and Birch-Hirschfeld $^{317}_{\text{Mar.10,'94}}$ report the successful removal of an adenosarcoma of the kidney from a child 7 years old. Brandt $^{336}_{\text{Mar.31,'94}}$ removed a sarcomatous kidney from a child 13 months old. Malcolm $^{2}_{\text{Feb.3,'94}}$ performed nephrectomy on a child of 23 months for a sarcomatous kidney. The child was well fourteen months afterward. Verhoef $^{266}_{\text{Aug.,'94}}$ performed a similar operation for sarcoma on a child $2\frac{1}{2}$ years old. The operation was successful. The child died suddenly ten months afterward. Schmid $^{336}_{\text{No.31,'93}}$ reports a nephrectomy for renal sarcoma on a child of 6 months. Three years afterward the child was in perfect health and the author considered the cure

complete. J. B. S. Holmes, of Atlanta, [117] May,'94 reports a successful nephrectomy on a child of 13 months.

Aldibert [118] Nov.,'93; [112] Apr.,'94 has collected the following statistics relative to nephrectomy for malignant disease in children: 45 nephrectomies gave 20 deaths, 4 incomplete operations, and 21 operative cures. Of the 20 fatal cases, 13 died of shock, 4 by septic peritonitis, 1 by volvulus, and 2 from some undetermined cause. The 4 incompleted cases died,—2 from shock and 2 from the progress of the disease. This gives 22 post-operative deaths, or a mortality of 48 per cent. Children bear nephrectomy for other causes well, and even in this list there are 8 recoveries of children from 6 months to 2 years of age. Recurrence of the disease is the rule. Of 21 operative recoveries, 11 died within nine months and 1 lived as long as eighteen months, 8 were lost sight of within four months, and but 2 appeared to be cured, having remained without recurrence eighteen months and two years after the removal of the growth. The cases reported this year, however, apparently make a much more favorable showing than those in the statistics just quoted.

Krönlein [214] Aug.1,'94 reports the case of a woman, 67 years old, alive and well nine years after nephrectomy for cancer of the kidney. The author states that this is the longest case on record of life after this operation for such disease.

The Transverse Incision in Nephrectomy.—Robert Abbe, of New York, [96] Jan.,'94 advocates, for the removal of large-sized renal tumors, a transverse incision over the prominent portion of the tumor extending from the lumbar muscle nearly to the median line, the patient, if necessary, being placed in the Trendelenburg position. Péan, of Paris, [14] Apr.8,'94 also advocates this incision for some cases of nephrectomy.

Traumatism of the Kidney.—Henry Morris, of London, [1077] Aug.1,'94 in an article on the symptoms and treatment of contusions and lacerations of the kidney, states that serious laceration of the parenchyma of the kidney or rupture of the pelvis of the kidney may occur without causing any of the characteristic signs of the injury, either at the time or till some considerable time afterward. One case referred to by the author was under careful observation for three weeks from the hour of his accident and another five weeks before developing any sign of kidney laceration. After that time

a swelling appeared in the loin. In these cases the symptoms which, sooner or later, develop to indicate renal injury are hæmaturia, anuria, or a lumbar swelling due to extravasation of blood or urine into the perirenal tissues. Any one of these three symptoms may render operative interference necessary. In this connection the author says: "Hæmaturia requires a lumbar exploratory incision if, from its amount or prolonged continuance, the strength of the patient is being exhausted. In these cases the bleeding will most likely be controlled by ligature or by packing the wound, and, if not, nephrectomy must be performed. Hæmaturia is also the indication for the lumbar operation when it causes an accumulation of blood-clots in the bladder. There is great danger in delaying operation in these cases; the decomposition of the clots and the cystitis which is excited by their presence, as well as the frequent catheterization needed, expose the patient to all the dangers of suppuration of the wounded kidney, and also to the risk of infection.

"Primary anuria is not an indication for operative treatment, because temporary suppression of urine is a common result of shock. If, however, anuria continue for more than twenty-four or thirty-six hours, and after the other symptoms of shock have passed, or if it supervene some few days after the accident, the lumbar exploration ought to be made.

"The presence of a distinct and increasing swelling in the renal region makes an early incision through the loin imperative: it is the only way to cut short the progress of the case, to limit the extravasation into the perirenal tissues, to check or prevent suppuration, to prevent sloughing of the peritoneum, and to save the life of the patient. If the swelling is caused by blood there is no other way of evacuating it or of stopping the hæmorrhage, and thereby of removing the pressure effects upon the kidney, ureter, vessels, and surrounding parts. If the swelling be due to urine an incision, followed by drainage, is much safer than aspiration, and secures a quicker recovery."

Morris advocates partial nephrectomy and resection of the kidney, where such a procedure is possible, rather than the complete removal of the organ. Numerous interesting illustrative cases are cited. Tuffier $\frac{14}{\text{Apr.8,'94}}$ reports five cases of traumatism of the kidney. All recovered. Operative interference was required in but one

instance, in which there was much tumefaction of the loin. The author holds that primary operative interference in these cases should be exceptional, that hæmaturia is the only indication for it, and that even then the bleeding should be so great as to threaten life before resorting to it.

Roux, of Lausanne, [197 Sept.20,'94] reports three cases and Marchant [14 Apr.1,'94] one of traumatism of the kidney.

SYPHILIS.

By J. WILLIAM WHITE, M.D.,

AND

W. H. FURNESS, 3D, M.D.,

ASSISTED BY

H. M. HILLER, M.D.,

PHILADELPHIA.

GENERAL HISTORY, ETC.

At the meeting of the American Medical Association, held in June, 1893, Jelks propounded the view that there was conclusive evidence of the existence of syphilis in Biblical times, and that Moses made most strenuous laws to restrict its prevalence. He furthermore maintains that many of the Psalms are David's lamentations over the osteocopic pains of syphilis. He quotes quite extensively from the Bible and from the book recently written by Buret—on the "Antiquity of Syphilis"—to prove his point. The sum and substance of his paper were given in the ANNUAL for 1894. Rogers[61 Feb.,'94] suggests that Jelks has trusted too implicitly in Buret's diagnosis of syphilis, and that the latter, who has chosen the Latin version of the Hebrew text (edition of 1715, found in the National Library of Paris), has studied this obscure old version with rather too much of a determination to find allusions to syphilitic disorders. Harmonic, whom Jelks quotes, has stated, in his monograph on venereal diseases among the Hebrews, that Sarah's barrenness was due to syphilis; and, as she regained her fertility and became pregnant late in life, he maintains that her barrenness was not consequent upon the menopause, but upon syphilis. But, according to Harmonic, Sarah conveyed the syphilitic taint to Abimelech, whom, as Rogers shows by quoting Genesis xxii, she did not see until she was well stricken in years and had passed the menopause; and, at this time of her life, Harmonic himself declares that she was cured of syphilis. Rogers maintains that it is hardly likely that Sarah should have been syphilitic and Abraham

not know it; otherwise he would have used this pretext to keep her out of Pharaoh's lustful clutches. Furthermore, a woman so impregnated with syphilis as Jelks, Buret, and Harmonic assume Sarah to have been would not be likely to be attractive enough to captivate Pharaoh, Abimelech, *et al.* Rogers thinks that it is in the obscure Latin version of the Bible (1715) alone that any evidence can be found that David was a victim of syphilis. The word ulcer, or ulcers, does not occur at all in the common version, but on these words great store is set in Buret's quotations from the Latin version. Rogers does not wish to maintain that syphilis did not exist among the early Hebrews; but he thinks that there is not sufficient evidence in the common version of the Bible to pronounce either of the prominent Biblical characters mentioned by Jelks and Buret as syphilitic.

In so far as the antiquity of syphilis in Eastern Asia is concerned, Ashmead [61 Feb.31,'94] states that the disease was known in Japan as long ago as 660 B.C., and that in China syphilis was certainly known in the Chu dynasty,—1122 to 314 B.C. From China (where they claim that the demon of this disease originated in the heat and moisture of regions still farther to the southward) the disease migrated to the southern parts of Japan, and thence rapidly spread over all the islands. Ashmead is of the opinion that the pre-Columbian syphilis of America originally migrated from Eastern Asia *via* Japan and across the Behring Sea. It is proven that syphilis existed among the most ancient races of America, namely, the Aztecs of Mexico and the Incas of Peru; but it is a disputed point whether or not these races are descendants of Eastern Asiatic races. Ashmead says that, although such an authority as Brinton is possibly opposed to this view of their origin, nevertheless he believes that there is sufficient similarity in designs and in the workmanship of wood-carvings and paintings to the Alaskan and Vancouver Indians to warrant the assumption that they are offsprings of the same race. That the Aztecs of Mexico and the Incas of Peru came from the north is not mythical, and if they came from the north it is reasonable to believe that they crossed from the nearest point of Eastern Asia. He quotes Farnsworth as of the opinion that the "totems," carved implements, and drawn figures of the Alaskan, Californian, Mexican, and Peruvian aborigines "show marked traces of Japanese

influence." On this ground he jumps to the conclusion that if a Japanese settlement were formed in Alaska, syphilis must have existed in it; and if the Alaskans and Vancouver Indians were directly connected with Central America or Mexico, as indicated by a similarity in their arts, then the syphilis of these two countries had a northern origin. Judge Wickersham is also quoted as authority for the opinion that the Alaskan and Vancouver Indians were the ancestors of the Mexican and Central American tribes. The aborigines about Puget Sound maintain a distinctly Mongolian type of civilization; their houses are built in exactly the same style as the Japanese, and many pure Aztec words linger north of Puget Sound; yet they make no pottery, and, as no nation ever lost that art, it was never known to this people of the northwest territory. It therefore stands to reason that the art was learned after these early tribes began to migrate southward and distribute themselves in Mexico, Central America, and Peru, and that the migration was not by San Francisco Bay, but by Great South Lake to Mexico. Humboldt, Prescott, and other authorities place Aztlan, the ancient Aztec living-place, in Puget Sound. May it not also be granted that this is a further proof of their Asiatic origin? Ashmead decides that, if Judge Wickersham's conclusions are true, they directly connect the earliest traces of syphilis in America, found in the bones of the Ohio Mound-Builders and Aztecs, with an Asiatic origin, and the route upon the Behring Sea seems the only satisfactory solution. [If the aborigines of Puget Sound ever knew the art of making pottery, and "no nation ever forgets that art when once acquired," is it rational to suppose that these Puget-Sound Indians came originally from Eastern Asia, where pottery-making has been known since the beginning of time?—J. W. W.]

As no country would be proud of being the originator of syphilis, this disgrace is therefore constantly put off upon the next-door neighbor. Binz [69 Nov.2,'98] is firm in the belief that syphilis was brought to Europe by the sailors who returned with Columbus. The disease known to the ancient Egyptians as "uchedu," and which is described in the papyrus discovered by Ebers, Proksch [45 p.537,'91] regards as syphilis; but Binz maintains that this is not sufficiently well established and that all the symptoms would point equally to some scorbutic affection. Furthermore, in the

history of the Jews contained in the Bible he thinks that no reference is made to syphilis, but that gonorrhœa is alluded to in several instances as a running issue. The nocturnal osteocopic pains, which some authorities consider as references to syphilis, may quite as reasonably be supposed to be merely references to acute rheumatism. In a similar manner, no allusions to constitutional syphilis are made by the old Greek and Roman writers. All authorities, however, agree that in the year 1495 syphilis was so wide-spread that it might even be spoken of as epidemic. It was then known as "*le mal francais*" and "St. Job's disease." Diazde Isla, writing from Barcelona between 1510 and 1521, speaks of it as a new disease which in 1493 was known as the "serpentine disease" in Barcelona, whence it spread over all Europe. The sailors who returned with Columbus from the New World he holds directly responsible. From Spain it spread to southern Italy, and in 1495 Charles VIII of France, who was waging war against Sicily, took possession of Naples, and there his army let loose the demon syphilis which they had captured in the south. In Naples the disease was spoken of as the "French disease," and when it had spread in France after the return of the army it was known as the "Neapolitan disease"; so it appears that, even at that early date, the birthplace of syphilis was foisted from one people to another. The most convincing authority for the introduction of syphilis to Europe quoted by Binz is Gonsalvo Hernandez, commonly called Ovredo, who, in 1502, went to the new-found West Indies and lived there ten years as a missionary. In his history of the Indies he states that beyond a doubt this new skin disease came originally from the "Island Hispaniola," meaning Spanish America. Kühner, [189 Nov. 23, '93] on the other hand, thinks that it is a well-established fact, from their writings, that syphilis was known to Herodotus, Hippocrates, Celsus, Galen, and many others of their time; and it has also been proven quite conclusively by Hyde, of Chicago, that syphilis existed in America before the time of Columbus. The same author thinks that the disease described in the papyrus, translated by Proksch, was unmistakably syphilis.

Albeit Columbus and his men may have been responsible for the introduction of syphilis to Europe from America, this country cannot be said to be the original source of the disease, since Ashmead [245 Jan., '94] has found a book published in Japan, in 1801, entitled,

"A Brief Account of Syphilis," whose author states that syphilis was a well-known skin disease in the Clin dynasty, about 700 B.C. The Japanese author recognizes the three stages of the disease, but seems to consider tuberculosis as part of it, and also declares that syphilis contracted by a congenitally syphilitic person is much more violent. Calomel is the chief ingredient of all the remedies which he advises. In another article Ashmead [112 May,'94] gives a synopsis of a Chinese secret manuscript originally written under the Ming dynasty, about 1368 to 1644, and reprinted in Japan A.D. 1724. The author, Chin-shi-see, is apparently familiar with the disease and, what is quite remarkable, propounds Colles's law. The treatment and remarks about the influences which the elements exert on the manufacture of his special medicine contribute little to our knowledge of the disease, which, he says, originated in southern China and was first fully described in the Sang and Yuen dynasties.

BACTERIOLOGY.

Golasz [14 Mar.21,'94] claims to have found a polymorphous microbe in syphilis. In 1888 he described a short rod-bacillus resembling Koch's tubercle bacillus, which he found in ulcerating syphilitic vegetations, but differing from Koch's bacillus in its method of staining. Two years later he found the identical bacteria in the blood of a patient who died during the acute stage of syphilis. Along with these short rods were also spores and jointed filaments 60 μ long. He concludes that there existed a polymorphous bacteria similar to the leptothrix or more closely allied to the cladothrix. He attempted their culture upon human bouillon, but without result. He then secured nuclein from the spleen of subjects unaffected with syphilis. Diluted nuclein was inoculated with blood from a syphilitic, with the production of a pure culture of the polymorphous bacteria exactly similar to those found by microscopical examination of blood taken from a syphilitic person. He further observed that in the freshly-prepared solution of nuclein the vegetative forms predominated, while later on the spores and zoöglea forms were developed. The same condition exists in the blood when the syphilis is in full evolution. The filaments and short rods are then more often met with; while, after medication has modified the culture-media, the spores and zoöglea appear. These same phenomena are observed also in all the maladies

caused by the leptothrix and cladothrix, such as syphilis, tuberculosis, leprosy, and glanders.

Hudelo and Bourges [59 Mar.10,'94] have studied the nature of the bacteria that cause the formation of false membrane that forms on syphilides, their object being to demonstrate, if possible, an association with any single bacillus. In four new cases the following results were obtained: In two cases the bacterium coli commune was found, in one the staphylococcus aureus, and in the other the streptococcus pyogenes associated with the staphylococcus aureus and albus. As they were able to isolate the bacterium coli commune in two cases, they believe it plays an important rôle in the formation of the false membrane.

Winfield [157 Feb.,'94] gives the following history of the bacteriological work which has so far been done in the study of syphilis: "Since 1837 many bacteriologists have reported discoveries of various micro-organisms, some of which are worthy of brief note; for instance, Hallier's discovery of a micrococcus in the blood of specifically infected subjects, which greatly resembled that found in patients suffering from scarlatina. In 1879 Klebs claimed to have found other cocci and bacilli, and also succeeded in making cultures of the same. Again, in 1882, Birsch-Hirschfeld made a similar discovery, but until 1884 no one succeeded in detecting a constant form; and as there were no definite attempts made to obtain cultures nor the scientific inoculation of animals, the results were necessarily unsatisfactory and contradictory. Late in 1884 Lustgarten announced that by a special method of staining he had succeeded in detecting bacilli in syphilitic tissue. These differed from other similar organisms by their reaction to certain stains. They very closely resembled the tubercle bacilli, but could be differentiated from them by their reaction to mineral acids, and also by the presence of knob-like swellings on their ends and their 8-shaped forms. This discovery of Lustgarten raised the hope that at last the exact etiological factor had been found; but a year later Cornil stated that bacilli reacting to the same stain as that of Lustgarten could be found in the normal smegma, and Köbner also said that, while they might be found in genital chancre, they were never observed in secretions or tissues from extra-genital primary lesions. Lustgarten's and other investigations regarding the bacteriological origin of this disease have demonstrated to a

certainty the presence of bacilli in syphilitic tissues. Just why the results still lack uniformity is not clearly understood, but, with the light already gained, we trust the day is not far distant when the microscopical appearance of the syphilitic bacilli will be as well known as the tubercular now is. The latest etiological discovery was in 1892, when Daehle claimed to have found parasitic protozoa in syphilitic secretions. They are described as flagellate balls of various sizes, possessing active movement and change of shape."

GENERAL COURSE OF THE DISEASE; METHODS OF CONTAMINATION.

Musser [9 Aug.11,'94] regards syphilis as on the wane, both in point of prevalence and malignancy. He gathers his statistics from his private practice and from the records of the Philadelphia Hospital, the only institution in that city in which early syphilis is treated. That such statistics lack precision he admits, but, nevertheless, they are about the most accurate that can be obtained, owing to the far-reaching ramifications to which the disease might ultimately be traced. In the Philadelphia Hospital there has been a progressive diminution in the number of cases of syphilis, notwithstanding the increase in the city's population and despite the fact that the statistics were begun just after the war, at a time ripe with venereal diseases. Syphilis is at present a mild disease; whether this fact is due to the more methodical and thorough treatment in the early stages of the disease or to better hygienic precautions it is hard to determine, but, whatever the cause may be, the fact remains that tertiary manifestations are not common and that visceral syphilis is rare. [There is much difference of opinion in the profession as to this matter. Personally, I agree with the writer.—J. W. W.]

Verchère [245 May,'94] maintains that repeated observations have confirmed the fact that syphilis may be contracted without the initial lesion. He reports three cases which had been under daily observation, in which no syphilitic lesions were present, yet the subjects communicated the disease to others, while they likewise presented no initial lesion. Cordier [16 Aug.18,'94] also maintains this point, and states that it occurs in about 2 per cent. of all cases, secondary symptoms being detected about fifty days after suspicious connection, no primary sore nor glandular enlargement being present.

In some instances, in from eight to twenty days after infection, there may be noticed on the penis some such lesion as balanitis or perhaps herpes, which in such a case appears to be syphilitic in nature. All genital sores should be regarded with grave concern when occurring for the first time subsequent to a suspicious coitus. [I do not believe that the evidence justifies the belief that syphilis —exclusive of syphilis by conception and hereditary syphilis— ever begins other than by the appearance of a primary sore. The reported cases are quite inconclusive of the contrary view.—J. W. W.]

Somewhat in opposition to Diday's statement, that syphilis occurs more often in men and is comparatively mild in women, stand the statistics of Khijin, $\frac{586}{\text{No.38,'94}}$ gathered in southeast Russia, a rural district where syphilis is almost endemic, and where the patients pay little or no attention to the early stages. This fact Diday may take as confirmatory evidence of Gemy's law, that syphilis acquired from an inadequately-treated case is always malignant. Khijin's statistics show that, out of 1443 cases of syphilis, only 42.8 per cent. were men and 57.2 per cent. were women. This but bears out the opinion of all Russian rural practitioners, that among the rustics women are attacked more frequently than men. Only 26.3 per cent. applied for advice in the condylomatous stage, and 73.7 per cent. suffered from gummata. Khijin happened to come across but five primary lesions among this large number of patients, and a careful inquiry into the history of all the cases proves that, beyond a doubt, in that section of the country fully 81 per cent. of the cases had been contracted in a non-venereal manner. Syphilis of the nervous system was rarer, and occurred later than would be found in a correspondingly large number of city patients. These statistics are summarized by Idelson. $\frac{109}{\text{Dec.,'93}}$

Observations on the incubation period of syphilis have recently been published by Bergh, $\frac{28}{\text{v.17,No.12}}$; $\frac{26}{\text{Feb.,'94}}$ who states that, from trustworthy data as to the time of infection in 254 cases, he has observed that the incubation varied from twenty-four to two hundred and four days,—that is, from the day of infection up to the outbreak of secondary symptoms. According to Ricord, this author states, the total incubation takes from four to six weeks, sometimes two or three months, and rarely from five to six months. Diday is said to put it at forty to seventy-eight days; Robert, from

five weeks to four months; and Lancereaux, from sixty to seventy days. Jaisel is said to have stated that he never observed the eruption prior to the eighth week after infection; Kaposi, never before the sixth or later than the twelfth week; whilst, according to Baumler, this period varies from nine to eleven weeks.

The quality of the virus and the physical condition of the recipient, of course, must play an important part. It has frequently been asserted, but never proved, that the virus emanating directly from a hard sore produces syphilitic symptoms of greater severity, and with a shorter incubation period, than that from secondary lesions. It may also be that the locality at which the virus is introduced into the system plays an important rôle in the length of incubation and intensity of the outbreak of symptoms. For instance, in a highly vascular portion of the body, the syphilitic poison would probably be absorbed with greater rapidity.

Bergh thinks that heredity may influence the incubation and severity in certain cases where non-syphilitic children of syphilitic parents finally contract a chancre. Neither sex nor age seems to bear the slightest influence upon the duration of incubation, and it is doubtful whether climatic conditions have any influence. It is, however, certain that the accession of an acute febrile disease, accompanied by high temperature (pneumonia, rheumatic fever, typhoid, erysipelas, small-pox, etc.), does lengthen the incubation. Other infectious constitutional diseases (malaria and tuberculosis) shorten it. A short incubation frequently is followed by severity of symptoms.

[The vascularity of the region has an undoubted effect on the size and severity of the sore,—*e.g.*, chancres of the lips or face are almost always much larger than those of the genitals. But that it has any influence on the period of incubation I do not believe. At any rate, the clinical facts to sustain this view are at present wanting.—J. W. W.]

Sufficient reliance cannot be placed upon the statements of the laity—especially the infected married portion—for us to base any conclusions as to the source of infection. This is the opinion expressed by Thomas [61] July 21, '94 in an article on the contagious period of syphilis. In his experience all contagiousness of the disease has vanished at the end of three years. In several cases quoted from his practice husbands who had been syphilitic for four or five

years had apparently affected their newly-married wives, but by persistent and close cross-examination he had in each case eventually wormed out the confession that the newly-married wives had strayed from the straight and narrow path, either just before or just after marriage. The tertiary lesions, he maintains, are merely sequelæ of the acute stage and are no more capable of transmitting syphilis than are the sequelæ which so often follow the acute specific exanthemata. Similarly, no one would imagine for a moment that diphtheria was still contagious from a person suffering from paresis following diphtheria. Syphilis being an inoculable disease, when the zymotic period has exhausted itself the patient is no longer capable of conveying or transmitting the disease. Syphilis can only be conveyed during the primary and secondary stages, and the latter ends not later than the third or fourth year from date of infection. We should not and cannot afford to base scientific axioms upon the statements of the laity. These statements are often studied deceptions; at other times they are honestly given, but from ignorant premises. (*Syphiliticus quisque mendax dum probetur contrarium.*)

[Nearly all syphilographers are agreed as to the non-contagiousness of the late or tertiary phenomena of syphilis. The rule is so unvarying that, after four years have elapsed, I do not hesitate to assure patients that no precautions are necessary, and that neither by marriage nor in any other way can they transmit the disease. There may be exceptions, but I have not seen one; and they would have to be frequent to justify the failure to give to syphilitics this assurance, which usually has a most beneficial effect upon them.—J. W. W.]

Robinson,[6] Sept. 30, '93 on examining a woman twenty-four days after she had connection with a man suffering from an initial lesion, found no sore on the external genitalia; the os uteri, however, was eroded, but no difference could be observed between the condition present and the clinical condition known as erosion of the cervix. The diagnosis was therefore left open until a roseolar eruption, general adenitis, and condylomata of the tonsils settled the question of infection. He says it is impossible by any examination to distinguish the difference between the initial lesion of syphilis on the os uteri and the erosions and ulcerations which are commonly met with in this position by gynæcologists. In the same paper

Robinson draws attention to the fact that chancres bordering upon any orifice—such as the meatus urinarius, the anus, and the mouth—are always most obstinate in healing and generally leave deep scars. This is due to the constant irritation from movement.

Cordwent $^{2}_{\text{Oct.28,'73}}$ believes that a man with syphilis should never marry, for his children will undoubtedly show traces of it. He cites two cases of syphilitics whose wives repeatedly aborted, were delivered of still-born babies, or bore children who developed symptoms of syphilis a short time after birth. He further believes the syphilitic taint modifies the course of all subsequent diseases. [This is only worth noting to illustrate the prevalence of a view which is so erroneous that the experience of nearly every practicing physician suffices to refute it, but which, nevertheless, crops out in medical literature with perennial vigor. Both theories are equally ancient and equally unfounded.—J. W. W.]

In speaking of syphilis in women, Shrady $^{59}_{\text{Apr.21,'94}}$ quotes Baumler as saying that the syphilitic poison, being absorbed by the mother through her syphilitic fœtus, evinces a very peculiar modification. Women who have borne several syphilitic children begin gradually to suffer an impairment of health without ever being infected in the ordinary way. A modified infection ensues, lacking in a primary local lesion and the stage of eruption. Gradually increasing pallor and emaciation, alopecia, glandular enlargement, isolated bony nodes, gummata of the cellular tissue, ulcers of the mucous membranes, and psoriasis palmaris are the sole syphilitic lesions that these women present, and they usually abort when they become pregnant. Shrady goes on to say that Ricord, Diday, Depaul, and Hutchinson claim that the contamination of the mother, termed by the French *choc en retour*, is the result of a re-absorption of syphilitic embryonic fluids, the embryo owing its disease to its father. This manner of becoming infected must not be confounded with that described by von Barensprung, namely, that which takes place through the semen with coincident conception. In these cases manifestations of syphilis generally occur in the tenth week of gestation. During the primary stage this author states that the disease is purely local, the blood and the tissues not yet being contaminated, and that the disease can only be propagated from the primary sore. In the secondary stage—at all events, the early part of it—the blood and the secretions from

the secondary lesions and the semen are highly contagious. When the secondary stage is of long duration it is not improbable that the blood and secretions lose their power of infection. So far as is known, the blood and secretions from the lesions of the tertiary stage are incapable of transmitting the disease. It is said, however, that in some cases of tertiary syphilis the semen is still contagious. In women inoculated by *choc en retour* no characteristic symptoms may appear before the climacteric. Then a peculiar cachexia may develop, apparently aroused by the strain and exhaustion incident to the physiological changes.

[The physiological secretions are not "contagious," speaking accurately, in any stage of syphilis. The saliva, the tears, the milk, the perspiration cannot be inoculated on a healthy individual with the result of causing syphilis. The semen cannot convey the disease except through the effect upon the embryo. How it carries it is as yet a matter of pure speculation; but there is no good reason for adding to the terrors of the disease to married persons by investing it with properties that do not belong to it.—J. W. W.]

Diday[211] Oct.1,'93 is of the opinion that the attenuation of syphilis observed by Constantin Paul was, in reality, due to the general condition of the patient and to the originally-mild character of the disease rather than to any immunity acquired by heredity. Paul's conclusions, based upon personal observation, were, briefly, as follow: That the children who are born of a syphilitic man while he is in the full tide of his syphilis, when they are not hereditarily syphilitic, inherit, in a slight degree, his immunity to re-infection; so that, if they become infected later in life, they will have syphilis only in a very mild form. Diday thinks that there are several other considerations which should be taken account of before any law of this kind could be determined. In the first place, the source from which the syphilis is contracted must be considered; and, secondly, the condition of the subject to whom the syphilis is conveyed,—or, as he puts it, "considerations of the seed and the soil." Gémy's idea is that, from a secondary syphilis in long duration, and especially from one which has been well treated, only an attenuated and mild form can be acquired. In support of this theory, Diday instances the facts: First, that in men syphilis is much more severe than in women, for the reason that men

acquire it from women who, either from ignorance of their disease or from unconsciousness of its gravity, seldom undergo rigid treatment. Secondly, that syphilis acquired from suckling is of exceptional intensity, because syphilitic infants do not undergo treatment before they are put to the breast. But how would this account for the numerous instances in which the syphilis acquired from the same woman proved fatal to one man and most mild to another? However, taking all things into consideration, Diday thinks that it is the "soil"—*i.e.*, the bodily condition of the infected person—which plays the most important part in the determination of the severity or the mildness of the syphilis. Whatever tends to weaken the organism aggravates the syphilis.

[This is so true that it invalidates all arguments intended to show that a mild syphilis produces a mild syphilis, and that a grave form in the giver is followed by a similar type of case in the receiver. The general health of the individual is of overshadowing importance, and the surgeon who makes the hygiene of his syphilitic patients the object of careful attention throughout the whole period of treatment will have very few cases of "severe" or "malignant" syphilis among them, no matter what the source of their infection.—J. W. W.]

Mendel [22 Mar.21,'94] speaks of the virulence of syphilis acquired late in life,—that is, in men aged 55 years and in women about 45 years,—and cites four cases in which cerebral symptoms followed in patients inoculated between the ages of 53 and 60 years. Sigmund, however, considered syphilis late in life, both in regard to the number and character of the symptoms and the liability to relapse, to be comparatively mild. This opinion he formed on the basis of one hundred and fifty-seven cases observed by him. In opposition to this Dulong, basing his opinion on one hundred and thirty-one cases, has come to the conclusion that late in life the disease is very obstinate and grave, frequently affecting the abdominal viscera. All of Mendel's cases yielded rapidly to potassium iodide.

LEGAL RESTRAINT.

For the prevention of venereal diseases Lang [26 May,'94] offers the following thesis: 1. In spite of the recognized obstacles to the carrying out of practical measures in this direction, the authorities

are bound to do their utmost to check the spread of venereal disease. 2. Every effort should be made to provide free treatment and medicine, either in their own homes or as hospital out-patients, for people of slender means as well as for the very poor. 3. Venereal patients, desirous of being taken into public hospitals, should be admitted unconditionally. 4. Existing wards for venereal cases should be enlarged or increased in number. 5. For the benefit of venereal patients of the official and middle classes, suitable paying departments should be provided in public hospitals; or, where such already exist, they should be enlarged and made more readily accessible. 6. The erection of hospitals for the exclusive treatment of venereal diseases is not to be recommended. 7. Persons suffering from venereal disease must not be liable to degradation in their public or private office, employment, etc., or be subject to any material loss at the hands of benefit or sick societies and the like. 8. The dissemination of popular instruction in general hygiene, which should include information on the dangers of venereal infection, is strongly to be recommended. 9. Trade officials and medical functionaries should collaborate to prevent the propagation of syphilitic infection in particular industries. 10. Wet-nurses should be under the control of the sanitary authority. The health of the would-be wet-nurse and her family (especially baby), and also of the suckling and its parents, should be made known to the interested parties. 11. Clandestine prostitution, being under no sanitary control, is the greatest source of danger in the spread of venereal disease. 12. Non-registered girls, who have presumably spread infection, should be treated according to sections 16 and 17 *infra*. 13. Men who have spread the infection are to be arrested, treated for the disease, and prosecuted when cognizant of their condition. 14. Sanitary control can only be properly performed amongst officially-registered prostitutes. 15. Local conditions must determine the desirability or otherwise of definite establishments for prostitutes. 16. Prostitutes suffering from venereal disease must be taken at once to the general hospital. 17. Properly-controlled convalescent homes should be established in which girls who have been discharged from hospital "cured" may be detained for a few weeks or months, as the case may require, to insure thorough restitution to health.

Bulkley, $^{61}_{\text{Nov. 11, 93}}$ under the title of "Syphilis Insontium," enters at

some length into the non-venereal aspect of syphilis, and pleads for the awakening of the sanitarians and jurists to the importance of restricting, in some measure, the spread of this dread destroyer. In his own experience, he says that, as far as he can learn, fully 50 per cent. of all syphilitic females have acquired the disease in a perfectly-innocent manner, while among the married females that he has seen with syphilis he thinks the percentage of innocent victims would be fully 85 per cent. Although all realize that, at the best, but a moderate control is exerted over the spread of syphilis in those countries where prostitution is regulated and controlled by the State, nevertheless this slight control is better than nothing. Palmer $^{224}_{\text{June 30,'94}}$ is of the opinion that this governmental inspection of prostitutes, unless carried out with the utmost care, is practically worthless. The general naked-eye examination is perfectly valueless with regard to gonorrhœa unless the case is very severe and the vagina contains pus which is shown microscopically to contain the gonococcus. The infecting gonorrhœal fluid may lurk entirely within the uterus and be extruded only during coitus. In the case of chancre the chances of its being concealed within numerous folds of mucous membrane in the vagina or upon the os uteri are very great. In the great majority of cases the prostitute is more sinned against than sinning, for it is quite probable that, while she is most capable of transmitting the disease *per vaginam*, she is entirely ignorant of the fact that she has a chancre, and that not until a secondary eruption appears does she know that she has been infected. On the other hand, the male offender is almost always acquainted with the fact that he is the possessor of a contagious sore, and willfully transmits it to the woman. Such statements go to show that not only should the females, but also the males, undergo inspection in order to limit effectually the spread of syphilis.

With regard to receiving syphilitics in hospitals until they are no longer a menace to the public safety, Bayet $^{868}_{\text{Mar.18,'94}}$ argues that such a proceeding is practically impossible, since the contagious stage of syphilis is of a long and, moreover, uncertain duration, having periods of remission and recrudescence. The most that can be done is to receive the more grave cases and treat them until the symptoms vanish and discharge them, to return when the symptoms recur. Otherwise the accumulation of cases in the

hospitals would be enormous, since the greater part of them would have to be treated for at least two years.

The following statistics produced by Nevins [22 Nov.22,'93] will be of interest in regard to legal restrictions for the prevention of the spread of venereal diseases. From the British Army report it would seem that the number of deaths and of invalids was measurably decreased by the repeal of the Contagious Diseases Acts in 1888. The total fall in venereal diseases in 1891 was 103 per 1000 men,—from 504 cases to 401,—according to the annual report of the Indian Sanitary Commission. The deaths in Bengal, Madras, and Bombay were but 7. The editor of the journal appends a short note in which he states that the figures are misleading and represent but a small amount of the damage done to the soldier himself, let alone his wife and progeny.

Porter [138 July,'94] regulates his consent to the marriage of syphilitics by the following considerations: In the first place, marriage should be absolutely forbidden to any patient who, at the time of consultation presents any symptoms of syphilis, either primary, secondary, or tertiary. In the second place, marriage should be forbidden when the patients have not been subjected to a most thorough and prolonged treatment. And, lastly, before sanctioning the marriage of a syphilitic, the requirement of a sufficient treatment having been fulfilled, the physician should be satisfied that the patient is in perfect health and that he has had no symptoms, even suspicions, of syphilis for a period of at least two years. His objections to the marriage of syphilitics who are the victims of tertiary lesions are based not upon the fear of transmission of disease either to the offspring or to the wife, but upon purely hygienic reasons, as the outcome of such a marriage would be no more likely to be fruitful and beneficial to society than if the patient were far gone in any current disease, such as tuberculosis, nephritis, alcoholism, etc. The time which elapses between the primary lesion and marriage is from three to four years when the foregoing limitations are considered. White [138 July,'94] does not require such long immunity from symptoms. As a general rule he tells his patients that they must wait four years; but if, at the end of three years' time, the patient should have a slight mucous patch, he does not make him wait two years longer. He has, of late years, come to rely much more upon the length of

time which has elapsed between the primary lesion and the date of marriage than even upon the thoroughness of the treatment.

EXTRA-GENITAL SYPHILIS.

Downie [6 May 5,'94] believes that extra-genital chancres in children are usually not at all typical and, for that reason, are not diagnosed. He cites four cases of lip chancre, only one of which was indurated. Each was followed by secondary symptoms, making the diagnosis certain. He further believes that secondary symptoms in children are much severer than in adults, and that the larynx is much oftener involved, as shown by the huskiness of the voice being a common symptom. Treatment is less effective in the young. Gray powder is apparently inert, while bichloride of mercury with arsenic gives the best results. [This view, as to increased severity, is more in accord with the experience of the profession than the one advanced above. Both are worthy of further careful investigation.—J. W. W.]

Ricketts [61 Dec.16,'93] reports three cases of chancre occurring in children. Two were anal sores in boys 12 years of age, the victims of unnatural intercourse. The third case was a child of 7 years with a chancre of the lip; source of infection unknown. To this report he adds seven cases of gonorrhœa in children, one boy aged 9 years having infected four girls of about equal age; a second youth of 12 years was the source of infection for another girl of 11 years. None of these cases were treated by the author, who believes, without giving any special reasons for the same, that the virulence of both syphilis and gonorrhœa in children is mitigated, and that the duration of the former is also lessened as compared with the same disease in adults where a like treatment is employed. [It would require much more extensive statistics to demonstrate this than any that have yet been published. So far as I know, there is no good clinical ground for such a view, which, if it were allowed to modify the period of treatment, might work harm.—J. W. W.]

Van Harlingen publishes [119 Sept.15,'93] three cases of extra-genital chancre. In the first, a woman wounded the palm of her hand with a nail and subsequently handled some foul rags from a hospital ward. A week or two later the sore became indurated and discharged a serous fluid; eight or ten weeks later general

malaise and aching pains were followed by an erythemato-papulous eruption on body and limbs. Appropriate treatment relieved the symptoms. In the second case, a boy of 9 years, both tonsils presented deep, ragged, and painless ulcers. The submental glands were indurated and there was an erythema on the body and limbs. The disease was probably contracted by sleeping with his father, a syphilitic. The ulcers yielded to mercury and potassium iodide and a local application of aristol, and the erythema disappeared. The third patient acted as wet-nurse for a syphilitic child. About one month after the child's death a fissure appeared at the base of the thumb, became indurated and increased to the size of a 25-cent piece, with depressed centre and serous oozing. The axillary glands became involved, and seven to eight weeks after the appearance of the chancre there were malaise, fever, and a general eruption, papular in character. Mercury controlled the symptoms, but iritis followed. The patient was not seen afterward.

Gaston $^{6}_{\text{Dec.23,'93}}$ presented a case of chancre of the abdomen, said to have been infected by bed-clothing. The axillary glands were enlarged, and with the appearance of the roseola was associated anasarca involving the whole body, the face excepted; the urine was scanty, thick, high-colored, and contained albumin in the proportion of 1.87 grammes (29 grains) to the litre (quart). Under the influence of an exclusive milk diet and iodide of potassium the œdema disappeared. Gaston rejects the theory of albuminuria *à frigore* or of mercurial origin, the patient having only taken mercury for six days. Although the man was addicted to alcohol, Gaston believes the albuminuria to be an unusually early manifestation of the action on the kidneys of the syphilitic virus. In the discussion Fournier detailed a case of chancre of the axilla, caused by a woman tickling the patient with her finger. The initial lesion was only found by recourse to Ricord's plan of "*la chasse au chancre par les ganglions*," which yielded an indurated scar, and, upon questioning, the patient recalled the existence of a sore at this point two months before.

Bush $^{1}_{\text{Apr.7,'94}}$ contributes a case of extra-genital chancre acquired in an unusual manner. A child of 10 years was troubled with pin-worms, some of which had crawled into the vulva. The mother, who had mucous patches, attempted to remove them by wiping the parts with a soft cloth. One of the parasites clung

tenaciously; the mother then expectorated upon the part to moisten it, and rubbed hard to remove the offender. Infection took place, and a chancre developed at the seat of the abrasion formed. Constitutional syphilis followed. The details of 40 cases of primary syphilitic affection of the hand are given by Fournier. [3 No.13,'94; 26 May] In 30 of these the malady was acquired in medical practice (4 obstetricians, 20 general practitioners, 3 students, and 3 midwives). The remaining cases were attributable to coitus (contact and biting). As a rule, the skin was not intact, either a small wound or some cutaneous malady, such as eczema, being present. The chancre in these cases appears either in the form of a benign superficial erosion or else as an ulceration, the latter having an irregular border; induration is sometimes absent, and fairly-severe pain is often experienced. Hypertrophic forms have been observed, and also a very rare fungoid type. Lymphangitis and phlebitis may complicate the disease, and indolent swellings of the cubital and axillary glands also occur. The disease, as a rule, runs a somewhat severe course, but Fournier thinks that it is more probably due to neglect of the primary sore than to any particular virulence of syphilis acquired in this manner. [There is usually exceptional delay in applying for advice in such cases, even when medical men are the subjects. They persist in doubting the specific character of the sore and are not uncommonly well advanced in the secondaries before beginning treatment.—J. W. W.]

Judkins [245 Dec.1,'93] reports two cases of extra-genital chancre, both transmitted by barbers' manipulations. A patient having his hair clipped was wounded by the "clippers" on the scalp, half-way between the ear and occipital protuberance. The resulting sore was somewhat indurated, depressed, and had a slight discharge. The lesion was diagnosed as chancre and treated accordingly. The second patient had a sore on the eyebrow, and had been inoculated by a barber suffering from a papular eruption of the palm. He was under treatment for three years, and six years later had no evidence of the disease. [The barber's eruption must have been an ulcerating one. The ordinary papular palmar syphilide, like the other dry eruptions, can scarcely be said to be inoculable.—J. W. W.]

Hutchinson [22 Nov.28,'94] details a case of chancre of the conjunctiva.

It was at first diagnosed as ulcer of the cornea and scraped, but submaxillary buboes altered the diagnosis, which was confirmed by the plentiful papular eruption which soon followed. Cadell [2 July 14,'94] describes a primary infection on the lower lip,—a large, indurated sore, associated with submaxillary buboes, headache, slight ptosis, and a macular eruption on chest, abdomen, and arms. The patient "kept company" with a young man who had a mucous patch on his upper lip, and other evidences of syphilis elsewhere on the body. Russell [199 Oct.,'93] showed a case to the New York County Medical Society, a child, 5 years old, with a chancre on the tongue, —a painless, indurated sore on the centre of the dorsum with cervical adenitis and roseola. Though the child's father and mother both had a questionable history of syphilis, the author thinks the child's bedfellow, also similarly affected, was responsible for the infection. He was given the mixed treatment and rapidly improved.

Gold [336 June 9,'94] maintains that in many parts of Russia it is well known that the extra-genital infection of syphilis is more frequent than the genital. As an example the author cites the history of a child, 1½ years of age, who became infected on the mouth while playing with other children. The child in turn infected the mother upon the breast at nursing; the father acquired from his wife a chancre on the lip, and finally an older daughter became infected with the same disease. In another case a man bore, on his genitals and lip, a chancre, and at the same time his son had a large primary sore on his tonsil. Morrow [245 Oct.,'93] records a case of chancre of the hard palate, with extensive involvement of the submaxillary glands and maculo-papular eruption of the chest and extremities. The appearance of the sore suggested a gumma rather than a chancre, but the absence of any other lesion and the presence of the eruption assured the diagnosis. Five hundred and thirty-nine cases of extra-genital chancre treated at the University of Christiana during twenty-five years are reported by Krafft-Ebing. [369 Jan.25,'94] During the period from 1867 to 1894, 2916 cases of genital syphilis were also treated, making the percentage of extra-genital origin 15.6 per cent. Comparing by years, there was a decrease of the genital infection and a corresponding relative increase in the extra-genital method. However, with the official suppression of prostitution, the genital increased and the

extra-genital decreased. The chief seat of the lesion was upon the lips. In 280 cases 51 per cent. were so located, 20 per cent. in the throat, and 20 per cent. upon the mammary gland. By way of symptomatology the author required the indurated sore and the glandular involvement. In three-fourths of the cases the infection is attributed to drinking-cups, kissing, nursing, and the pipe and cigar. Curiously enough, when adults were infected upon the lips or mammæ the disease was particularly virulent and recurred for a long time. In the treatment, mercury was only exceptionally employed, while potassium iodide was always used in cases of long duration. Iron and quinia were also given, and, in iritis, atropine, vesication, leeches to the temple, and potassium iodide were employed.

Gulpin [164 Feb.22,'94] thinks that many cases of rectal chancre go unrecorded for two reasons: First, from authors confounding anal and rectal chancres with each other and not examining the rectum in cases where the initial sore is not found in other accustomed situations. The cause of rectal chancre is always sodomy, occurring three times in four in women. The chancre is evasive in character; induration is very well marked, but also associated with inflammation; consequently it is not very characteristically indolent; and, furthermore, the adenitis partakes of this double character and can be felt by high rectal exploration. Phagedæna is a frequent complication. By way of local treatment injections of chloral, 1 per cent., by the two-way catheter, and suppositories of opium and iodoform are recommended. At the meeting of the St. Petersburg Medical Society, Peterson [21 Mar.3,'94] presented a case of lip chancre with swelling of the submaxillary lymph-glands, and related three other cases of extra-genital chancre,—one of the tonsil, another of the finger following the bite of a cholera patient, and the third on the lower lip from accidental injury. To this number Blessig added a fifth in which a patient suffered from tonsillitis, followed by an abscess of the right side of the neck. This was opened and healed promptly, while the tonsil became the seat of a chancre. A sore appeared on the eye (an episcleral abscess), also painful subcutaneous indurations on leg, fever, and finally a papulo-pustular eruption with syphilitic characteristics. Tansley, [51 July,'94] in reporting a case of syphilis with gummata at the age of 7 years, details the history of the parents and shows the

infection to have come from the father inoculating the mother, who imparted a lip-sore to the nursing child from her fissured and ulcerated mammæ. Both parents died from syphilitic affections, but potassium iodide, codliver-oil, and proper diet relieved the child. Rochon [31 July 21,'94] cites three cases of primary sore on the ear from the service of Fournier and one from his own practice. The first patient had an indurated sore on the base of the left lobule, followed by cervical adenitis and a papular eruption. The chancre developed at the seat of a previous lesion, the source of infection being unknown. In the second the origin was directly traceable to the bite of a man; the wound became the seat of a phagedænic ulceration invading the auditory canal and eventually also the tympanic cavity. The supposed cause of the third case was the syphilitic husband of a woman who presented a chancre in the auriculo-mastoid groove. In the author's own case, that of a girl 4½ years of age, the ears were pierced by a traveling peddler for the purpose of inserting ear-rings. The perforation in the left lobule healed promptly, while the right became the seat of an indurated ulcer. When seen, some four months after perforation, the ulcer was quite characteristic of chancre and was associated with general adenitis and a papular eruption on the body, in places squamous in character. Antisyphilitic treatment was ordered and the parents stated that the symptoms rapidly improved, though the author did not himself again see the patient.

Standish [99 Mar.8,'94] reports two cases of chancre on the eyelid, there being at present over thirty similar cases recorded. In one case there was a swelling of the inner lower lid, resembling lachrymal abscess; redness and pain were present, and also a central induration. The preauricular and submaxillary glands on the same side rapidly swelled to large size, with simultaneous inflammation of the pharynx. Two months later he had syphilitic iritis in the same eye, and, later still, a general eruption. The source of infection was probably a towel which a man with secondary syphilis had previously used. The patient in turn infected his wife, who bore a syphilitic child. The second man had an ulcer on the conjunctiva of the lower lid, induration, and preauricular adenitis. Some months later the eruption appeared. The source of infection in this case is also attributed to the public towel.

Post [99 Mar.8,'94] adds one doubtful case and also an authentic case of

chancre of the eyelid. A child of 5 years had a supposed stye on the lid. This disappeared, leaving an induration, but was followed by adenitis and eruption of papules, especially about the mouth, nose, and vulva. His father, mother, and one other member of the family were at the time affected with syphilis. The author had seen four chancres of the lip and knew four doctors who had initial lesions of syphilis upon the hands.

Wigglesworth $^{99}_{\text{Mar.8,'94}}$ observed a woman with two chancres on the face, just below the angle of the mouth, of two months' duration, associated with dry papules on the body and mucous patches.

Chapin $^{100}_{\text{July 19,'94}}$; $^{211}_{\text{July 29}}$ reports a case with an unusual location and incubation period. A soldier discovered a small sore on the inside of his right nostril three days after coitus. (The proof of which the author establishes by several facts and dates). The sore took on the characteristics of the primary lesion of syphilis, was followed by adenitis of the glands about the greater cornu of the hyoid bone on both sides and subsequently by a roseola. The author thinks the adenitis in the hyoid region pathognomonic of chancre of the mucous membrane of the nose. There are (with this case) now twenty-one cases of chancre of the nasal mucous membrane on record ("*pituitaires*"), of which five are reported from Lyons. In the 739 extra-genital chancres of Fournier's statistics of 1892, 13 were of the nose and but 2 were on the mucous membrane. At a meeting of the Berlin Dermatological Society Lewin $^{4}_{\text{Jan.22,'94}}$ presented two cases of chancre of the lip followed by characteristic secondary symptoms and a case of diabetes insipidus of syphilitic origin. The latter patient suffered from secondary syphilis and gummatous ulcerations. After the injection of sublimate diabetes appeared, with intense headaches. Brain syphilis was considered as the cause, and the administration of appropriate remedies was begun.

RE-INFECTION.

Neumann $^{22}_{\text{Apr.18,'94}}$ presented several cases, before the Vienna Medical Society, confirmatory of his views upon the localization of syphilis. Charrier $^{126}_{\text{July 15,'94}}$ believes that there exists a period, after the primary infection, during which the patient is not immune, and cites the following case in point: A man contracted a primary sore five to six weeks after coitus; twenty-one days after this

chancre two others made their appearance, and, one month later, the secondary symptoms appeared. The patient died of tuberculosis of a very rapid type. Neumann $_{\text{Dec.10,'93}}^{57}$ presented a case which leaves no trace of doubt as to the genuineness of both infections. The patient came to the clinic with a scar on the reflected layer of the prepuce and in the sulcus coronarius, with sore throat, general gland involvement, and a papular syphilide. He received ten calomel injections, and was dismissed as cured. Three and a half years afterward he returned with a purulent bubo, but also with periostitis of left tibia. Over a year later he again returned with a chancre on the skin of the penis at the peno-scrotal fold, and two similar sores on the mons veneris. The lymph-canal on the dorsum of the penis was much thickened and the inguinal glands on both sides greatly enlarged. He was carefully watched for awhile and soon developed once more the characteristic secondary symptoms,—sore throat, mucous patches on tongue, and eruption on back, chest, abdomen, face, and a distinct corona veneria.

[While this is, doubtless, a true case of re-infection, it must be admitted that it was also one with very insufficient early treatment. The statement that a patient "received ten calomel injections and was discharged *cured*" seems to me to indicate a want of appreciation of the natural course and history of syphilis, and an absolutely unfounded confidence in our ability to control it. There is at present no evidence before the profession that justifies the belief that ten calomel injections ever did or ever will "cure" a case of syphilis.—J. W. W.]

Eichhorst $_{\text{May 30,'94}}^{72}$ records a case of re-infection in which about one year elapsed between the first and second chancres. The patient contracted simultaneously gonorrhœa and an indurated chancre of the prepuce. During the course of the disease he was seen at various times with roseola and condylomata of the mouth and anus, and, nine months from the first infection, he was quite free from syphilitic symptoms. Three months later he again had chancre on the prepuce, followed by roseola and mucous patches. De Heredia $_{\text{Oct.31,'93}}^{542}$ reports a case that entered the hospital with an ulceration having all the characteristics of a chancre, followed, in a short time, by secondary symptoms. The patient said he had been treated, fourteen years before, for the same disease and in the same hospital. Allende, being called, recognized his former client

and confirmed the statement of the patient,—that he had undergone treatment for syphilis for eight months when he first came to the hospital.

Jelks [771 Apr.15,'94] reports two cases of re-infection. In the first general gland involvement, macular eruption, and angina syphilitica made the diagnosis certain; mercury was administered, but, the symptoms not being improved, another physician administered an herbal decoction ("probably Zittman's"), which soon relieved him. A papular eruption, however, returned upon his chest a short time afterward, but soon disappeared. Twelve years afterward four chancres appeared on the prepuce fourteen days after infection. Two of them yielded promptly to a dusting-powder of calomel, and the other two responded, four weeks afterward, to tannic acid and iodoform. Suspecting re-infection, he took mercury for two weeks. Nine weeks after infection roseola and sore-throat appeared and, later, a papular eruption. Inunctions of mercury were resorted to and, later, potassium iodide was given, and the patient's condition continued to improve. In the second case a patient contracted a chancre followed by sore throat and alopecia and, in one year, by deep ulcers on the leg and the arms, which healed with depressed, round, white scars. He was under treatment for syphilis, when he removed two warts and the same night exposed himself to infection. The site of the warts became inflamed and indurated and, later, inguinal buboes followed, but they disappeared under tincture of iodine. Despite the use of mercurial inunctions, three mucous patches appeared on the tongue, which eventually yielded to syphilitic treatment.

[There seems to be nothing conclusive about either of these cases. Both of them are susceptible to explanation without considering them to be cases of re-infection.—J. W. W.]

Boudougoff [31 May 19,'94] cites a case where the interval between infection lasted twenty-five years. The first attack occurred when the patient was 16 years of age, a chancre on the penis being followed by indurated glands, cutaneous eruption, and sore throat. Specific treatment was employed. Seven years afterward he was treated for neuroretinitis diffusa by inunctions and potassium iodide. Ten days after coitus a second sore appeared, followed in one month by roseola, which was in turn succeeded by papules. Williams [6 Oct.14,'93] reports a case with an interval of seven and three-fourths

years between infection. A chancre on the right side of the prepuce was followed by inguinal enlargement and roseola, with mucous patches of the fauces and ulceration of the tonsils. Mercurial pills for fifteen months dispelled all traces of the disease. A second chancre on the left side of the prepuce, almost eight years afterward, was followed, after an incubation of twenty-five days, by slight lymphatic enlargement. Tannate of mercury, 1½ grains (0.1 gramme) t. d., caused rapid healing of the sore, but was followed by mucous patches on the tongue and fauces; later the tonsils became ulcerated and a patch was discernible upon the lower lip; no rash appeared, and eight months after second infection there were no visible signs of the disease. Fisichella $\frac{319}{\text{June 23,'94}}$ contributes a case of re-infection observed from the onset of the disease. The patient was first seen with a primary lesion on the perineum, and four and a half months later papules appeared on the vulva, roseola upon the trunk, and general gland induration. One year later the patient had a papular eruption of the vulva and gonorrhœa. About the end of the second year pustular eruption appeared on the face and on the lower extremities; six months later, after treatment, the patient was much improved. Two years and nine months after the first infection patient re-appeared with an indurated ("bite") wound of the cheek, which she said was received in orgasm. The "biter" was also treated by the author for syphilis. Following this second indurated sore roseola again appeared upon the trunk with enlargement of the glands, passing from the submental to the axillary, cubital, and inguinal. On account of the roseolar and peculiar gland involvement the author thinks re-infection is undoubted in this case. Among several patients exhibited before the Vienna Medical Society, Neumann presented $\frac{22}{\text{Apr.18,'94}}$ two with re-infection of syphilis and showed the photographs of others. The first was a patient five or six years syphilitic, with past infection of three and a half years and a gumma on the site of last infection. The second patient, who three years before had a sclerosis on the under lip which disappeared after twenty-five inunctions, returned to the hospital with a rupial eruption on the thorax. The sclerosis of the lip returned, becoming hard and sharply defined, with white centre and brownish-red margins.

HEREDITARY SYPHILIS.

The stigmata of hereditary syphilis, as outlined by Fournier, [293 May,'94; 90 July,'94] are: (1) signs presented by general appearance; (2) skin cicatrices; (3) lesions of skeleton; (4) condition of testicles; (5) Hutchinson's triad.

Small stature, graceful form, and infantile appearance, at an age no longer that of infancy, comprise the first heading. The extent of cutaneous scars, their form (round, polycyclic, serpiginous, and multiple scars on a circumscribed area), and their location (especially about the mouth, nose, lumbo-gluteal region and soft palate) are all diagnostic signs. The skull, nose, and tibia are the bones chiefly affected. The testicles show sclerotic atrophy or arrest of development (infantile testicles). Under the title of "Hutchinson's triad" are mentioned disease of the eye (keratitis), otorrhœa, and the condition of the teeth,—these may be late in appearing; there may be malformation of the dental arch, and, finally, dental dystrophy, which latter includes all irregularities in the form and condition of the teeth themselves.

The incisors present the following peculiarities: Notching of the free border, thinness of the free border, atrophy of the summit, semilunar or crescent-shaped erasions (Hutchinson's teeth). This sign is almost always found in the superior median incisors of the second dentition. They are also enlarged at the neck and narrowed at the free border, and converge toward one another at the extremities. Fournier believes that Hutchinson's teeth alone are truly pathognomonic, while the other signs merely point to hereditary syphilis. [The enlargement of the spleen, painless, subacute, persistent, often preceding the eruptions, and in many ways strikingly analogous to the adenopathy of acquired syphilis, should not have been omitted from this list of symptoms. The inflammation of the diaphyso-epiphyseal articulations is still more characteristic. The keratitis is a symptom seen not at will, as a rule, but generally later in life.—J. W. W.]

Hereditary syphilis may simulate tubercular manifestations, as is evinced by a case reported by Power, [6 June 30,'94] in which there was an enlargement of both knee-joints. The glandulæ concatenatæ on both sides of the neck were slightly enlarged. The right knee was affected with synovitis; it measured twelve and one-half inches over the centre of the patella, while the left only measured

ten and one-fourth inches in circumference at the same place. There was a little synovitis of the left knee. The synovial membrane in both joints appeared to be thickened, and this was especially marked at the sides. The patient occasionally had a little throbbing pain at nights, but unless the knee was moved he did not complain of pain. He never had starting-pains at night. The boy whose case forms the subject of the present report would, in all probability, have been treated for tuberculous synovitis had he not had the good fortune to be brought by his mother, who presented obvious signs of tertiary syphilis. Her appearance at once put the author on the alert as to the true nature of the affection from which he was suffering. The facility with which the boy walked, in spite of the advanced disease in his knee; the comparative freedom from pain which he experienced; the slight symptoms of laryngitis; and, above all, the remarkable benefit which he derived from gray powder, all pointed to the accuracy of the diagnosis,—an accuracy which was confirmed by the fact that, when the gray powder was omitted for a fortnight, both elbows became affected with synovitis, the inflammation of the knees became as bad as at first, and the boy became really ill. These symptoms all passed away after the administration of small doses of potassium iodide and perchloride of mercury. It is of interest, too, to notice that the stress of the disease fell upon the skin and synovial membranes, for the teeth and eyes were entirely unaffected.

Etienne $\frac{220}{\text{July } 14,'94}$ claims that syphilis may be transmitted to the second generation, as is shown by the following history: A woman (first generation) had a syphilitic caries of the skull. Her son (second generation), at the age of 34 years, had apoplexy, cured by the administration of mercury. His wife was pregnant fifteen times, of which five were abortions, one a miscarriage, five children with mental troubles, one child who died of ulcers, and one with perforation of the palate and other hereditary lesions.

[The opportunities for error in such histories are so numerous that the great majority of them, as published, are worthless. The exclusion of acquired syphilis, paternal or maternal, in the intermediate generation is a matter of such difficulty that nearly all the literature like the above, intended to prove the transmission of inherited syphilis to a succeeding generation, is without scientific value.—J. W. W.]

Garini [996 Apr.25,'04] contributes a new symptom of hereditary syphilis. In a number of cases he has observed a cough occurring a few hours after birth and returning at intervals. Tobeitz [158 v.16,Nos.1,2] describes a case of congenital syphilis in which the chief symptoms and cause of death were attributed to a sclerosis and multiple gummata of the liver. A 7-week-old boy showed no traces whatever of syphilis except being poorly nourished and weak. He was born at the eighth month and had been fed on cows' milk and water. The first symptoms developed were bloody mucous stools; then a hard, stiff, œdematous condition of the legs, gradually extending upward. Cramps and vomiting supervened, the œdema increased, and the patient died. A post-mortem examination revealed, as the cause of death, the pathological changes in the liver mentioned above.

An unusual case of late hereditary syphilis, in a child of 4 years, is recorded by Vanderwelde. [51 Aug.,'04] The patient complained of headache and insomnia; then left-sided athetosis was noticed, and, after an epileptiform attack, hemiplegia, with facial paralysis, nystagmus, and dilatation of the pupils. Death occurred in convulsions two months after the onset. At the autopsy a gumma as large as an egg was found in the right cerebral hemisphere, occupying the interior of the optic thalamus, the internal capsule, and the right cerebral peduncle. Histological and bacteriological examination showed the lesion to be syphilitic, with absence of tubercle bacilli. The medulla and the spinal cord showed secondary degeneration of the pyramidal tracts. Changes characteristic of hereditary syphilis were found in the lungs, heart, liver, and testicle. A case which came under the observation of Hutchinson [806 Jan.,'04] presented, in addition to other symptoms of inherited syphilis, a phagedænic ulceration of the face, lasting over eighteen months. It involved the entire orbital cavity and the greater part of the cheek and forehead. The patient was also the subject of arrested development, and, though 18 years old, looked but 12. Iodoform ointment and the three iodides caused healing of the ulcer in two months.

Regnault [14 Nov.29,'03] believes that dental deformities are produced not only by syphilis, but also by all conditions producing degeneration. He has observed, in the teeth of monkeys and dogs, all the malformations observable in man. Despite the testimony of others

to the contrary, Taylor [1, Nov. 18, '93] claims that testicular involvement does occur in hereditary syphilis, and quotes six cases in support of his views. The most common affection is orchitis, and, while inflammation of the epididymis is sometimes observed, it is almost always as a complication of orchitis. Involvement of the vas deferens is quite uncommon, but occurs as a complication of the orchi-epididymitis. Neither of these affections is really of frequent occurrence, as shown by the fact that in literature something like fifty cases are more or less fully described or alluded to. Testicular affections are among the rarer manifestations of hereditary syphilis. Pathologically the testicular lesion has been recognized by Hutinel as early as the ninth and twenty-third days of birth. Clinically, however, it is seen generally in children from 3 to 6 and 12 months old, and in diminishing frequency in the second or third year. Somewhat exceptionally it is seen in later years, as in his sixth case at 15, and in a case mentioned by Fournier at 24 years. His own experience goes to show that these lesions occur in the offspring of one or both parents in a tolerably active condition of syphilis, and in many of the reported cases the conditions were similar. By way of treatment he recommends the mixed method continued, with intermissions, for two to three years, locally mercurial frictions, and finally removal of the organ when degenerative changes set in. Carini [336, Dec. 23, '93; Jan. 20, '94] claims that children with hereditary syphilis often appear quite healthy at first. The early symptoms hitherto recognized often do not appear until some weeks after birth, and some of them, like roseola, are so fleeting that an early diagnosis is rendered very difficult. Positive congenital signs are not common. As early a diagnosis as possible may, however, be of the greatest practical importance. Accordingly, the author calls attention to a symptom which, although standing in no apparent connection with syphilis, he has observed invariably in his cases,—namely, the occurrence, in the course of a few hours after birth, of uncommonly obstinate hiccough, lasting from one to three weeks. In every case a diagnosis founded on this symptom was subsequently justified. The author believes that this hiccough depends upon a neuropathic diathesis, to the development of which syphilis contributes materially. The hiccough proves obstinate to all ordinary treatment, but disappears after the mother has taken large doses of potassium iodide and

the nursling has been treated with Van Swieten's solution. Jacobi [51 Dec.,'93] describes a case of congenital syphilis presenting only an eruption and coryza, with snuffling. The skin showed discoloration, with characteristic remains of desquamation, especially on the palms and soles. A child of 8 years, described by Joachimsthal, [69 May 24,'94] showed peculiar osteal deformities. The right radius presented not only a painful swelling on its external border, but also a decided curvation and elongation. The styloid process projecting one and one-half centimetres below the ulna placed the hand in abduction at an angle of thirty degrees. Movements were painful, and to avoid the pain the extremity was held in a position resembling pseudopalsy. The other radius was similarly affected and there were also periosteal nodes on the tibiæ. Hutchinson [806 Oct.,'93] observed a patient, the object of hereditary syphilis, who illustrates the assertion that those who recover from the hereditary taint in infancy often display no tendency whatever to chronic ill health. He was treated in infancy, suffered later from keratitis, but recovered, and has had no other symptoms; neither does his teeth or physiognomy show any signs of the disease.

Fournier [212 Mar.10,'94] states that late manifestations of inherited syphilis may appear with or without previous manifestations of the hereditary taint. More often, however, the early manifestations are followed by a long period of good health and then the late lesions suddenly appear. There are cases where the parents, being syphilitic, bear apparently healthy children; these, being carefully observed, show no traces until they reach an age beyond which the congenital taint usually becomes apparent. In 282 such cases observed by the author, 251 occurred between 3 and 28 years; beyond that age only 31 times, though the limit was 65 years in 1 case. These very late manifestations are open to some doubt because of the exceptional circumstances required to affirm that, in such a long time, there had been no intercurrent syphilitic infection. The lesions are cutaneous, osseous, mucous, gummatous, etc., and those affections called parasyphilitic,—*i.e.*, tabes and general paralysis. In congenital syphilis ocular affections are most often met with, as opposed to the greater frequency of skin lesions in the acquired variety. In the diagnosis of congenital lesions the family history is of great importance and often confirms an otherwise doubtful history Webster [285 Apr.15,'94] describes a

case presenting nearly all the possible symptoms of inherited syphilis. In the well-known physiognomy the Hutchinson teeth, the muddy complexion, and cicatrices about the mouth are seen,—the effects of the disease during infant life; in the eyes, the ears, and the bones are evidences of its effect in early adolescence; in the eyes, the remains of interstitial keratitis, of iritis, and peripheral choroiditis; in the ears, deafness, which is almost absolute,—namely, for voice, right ear *nil*, left ear shouting close to; for fork, right ear *nil*, left ear reduced two-thirds. On the left tibia is an abundant periosteal thickening. A rare feature of the case was the partial destruction of the soft palate, the right side of which was adherent to the posterior pharyngeal wall, leaving only a small aperture through which nasal breathing is imperfectly performed. The patient was healthy until 3 months old, when she had thrush and snuffles, and has not been healthy since. At 10 years of age the eyes and ears were affected, at 11 the tibia, and at 12 the nose, which had probably also suffered earlier. Four months after the birth of her first child the mother had some venereal disease, followed by sore throat, but no rash, and was under treatment about two months. There is very strong evidence that she was infected by her husband at this time. Gaubet $_{\text{Sept.2,'94}}^{24}$ describes a case of hereditary syphilis in which the patient, a married woman, had three abortions, and was delivered of a monstrosity with the following anomalies, viz.: (1) a complicated harelip; (2) imperforation of the urethra; (3) talipes equino-varus of the right foot. She had been treated for gumma of the nose, and was under treatment with potassium iodide during the last pregnancy.

Coutts $_{\text{June 9,'94}}^{6}$ believes that Colles's law is not absolute, and cites a case in support of the theory that a child, suffering from inherited syphilis, may infect its own mother. The infant in early life suffered from snuffles and a rash on the buttocks, nasal discharge, fissures about the mouth, ulcers and mucous plaques on the buccal mucous membranes, cervical adenitis and cranio-tabes, muddy and elastic skin, and mucous patches about the anus. The mother was apparently healthy and had borne four healthy children. The father was also apparently healthy. After the child's mouth became involved, two small ulcers appeared on the nipple of the mother's right breast, which enlarged, and were followed by axillary adenitis,

ulcers of the tongue and throat, and nasty, colored eruption on body and flexor surfaces of the limbs. Alopecia and periosteal pains developed despite the administration of potassium iodide. Cotterell, however, [6 June 16,'94] takes exception to Coutts's statement, for the reasons that the father was healthy, that four other healthy children were born, that the rash seen immediately after birth was not necessarily syphilitic, and, finally, that there is no proof that the later symptoms may not have been from acquired syphilis instead of congenital. Ogilvie also believes, with Cotterell, that the evidences of congenital syphilis, in the case reported by Coutts, are not strong enough to warrant this being considered an exception to Colles's law; but does believe that cases reported by French, Italian, and German writers are less doubtful than the above-mentioned case. They are exceedingly rare, and such well-known men as Hutchinson, Fournier, and Jullien have never known one in their own experience. [I am not familiar with a single case which is so complete in all its details as to establish an undoubted exception to Colles's law.—J. W. W.]

Among the especial nervous manifestations of inherited syphilis Barker [157 Feb.,'94] numbers meningitis, often considered tubercular, especially those cases of tubercular meningitis reported as recovering,—hydrocephalus, epilepsy, hemiplegia and paraplegia, and imbecility and idiocy, though the latter diseases are too often attributed to this cause. Among adults, probably the brain is the structure most often affected, and the association of epileptiform seizures is not rare; especially is epilepsy developing late in life usually due to a gumma. Insanity, some cases of acute meningitis, and chronic meningitis, with thrombosis and softening, are certain sequelæ. Syphilitic arteritis with apoplexy can be added to the list of lesions. In the cord we find about the same lesions, though of not so frequent occurrence. The spinal nerves themselves suffer but rarely from syphilitic invasion. Insular sclerosis is often classed among the diseases due to syphilis. The cranial nerves are chiefly attacked at the base of the brain. The facial nerve is peculiarly exempt. Seventy-five per cent. of all cases of locomotor ataxia have a syphilitic history, and hysteria and neuralgia are often caused by the same disease. Local neuritis, especially of cranial nerves with consecutive atrophic degeneration; also compression of nerve-tract, with consequent symptoms by the

development of a syphilitic neoplasm, are forms which should attract attention.

SECONDARY SYPHILIS.

Diagnosis.—Vanderauwera [868 Mar.17,'94] claims that the exanthemata hold the first place in the diagnosis of syphilis, and also that the character will give important information as to the age of the disease. The slow development of the eruption and its polymorphism suffice to differentiate it from the acute exanthemata. The roseola commences on the lateral aspect of the abdomen, about the eighth week after the infection. Becoming more and more indurated, it reaches the breast by the tenth week and the back by the eleventh week. In the twelfth week it is found upon the extremities, and in thirteenth to the fourteenth is seen on the palms and the soles. The grouping is also of value. Recent eruptions are disseminated, while late manifestations are confluent, approaching a circle in form. The only genuinely characteristic symptom of syphilis is the adenitis. This is simple, the surrounding tissues being uninvolved. The glands are ovoid and elongated in recent syphilis, and pointed and more indurated in the later stages. The maximum induration is always in the glands nearest the seat of infection, and often serves to locate the chancre when it is otherwise unobservable, as in Finger's case of chancre on the great toe. This enlargement nearest the chancre is explained by adding an "adenitis of irritation" to the usual syphilitic adenitis, the extra irritation coming from various sources, as uncleanliness, local application, and destruction of anatomical elements.

The author thinks that the value of the induration of chancre in the diagnosis is losing ground. Coming on, as it does, in the second half of the third week, it delays diagnosis at least three weeks after infection; besides, in women it is especially difficult to diagnose the chancroid—or, as he calls it, the "ulcus veneris"—from the chancre or initial infection of syphilis.

Audry [1088 Jan.14,'94] recites the history of a man previously affected with a large, indurated chancre of the foreskin, followed by a papular eruption which soon became enlarged, giving the man's skin the appearance of a leopard's. The papules resembled purpuric spots in appearance. The patient was affected, some seven months later, with serpiginous syphilis, remarkable for the number and extent of the spots upon the trunk, arms, and thighs. The

author holds that it is rare to see such extensive lesions at the present day.

Kirley [65 June,'94] reports a case of secondary syphilis in a young woman who had contracted a genital chancre six months previously. In due time the glands of the inguinal region became enlarged, but did not suppurate. Two months later a maculo-papular eruption appeared and covered the abdomen, face, and back. Under treatment these lesions disappeared, but a second eruption manifested itself in two weeks. The present lesions are most numerous upon the face, covering the whole nose, right ear, and a small portion of the left. They are papular in form, confluent, bright-red in color, and form large patches of plaques covered by dark, thick, green crusts. A few isolated lesions are scattered about the region of the genitals and on the inner side of the thigh. There is also a round patch on the flexor side of the right wrist. No pruritus or pains attend these lesions, but the patient complains of rheumatic pains in all the joints and of alopecia. The cervical and epitrochlear glands are enlarged. Physical examination reveals no lesion of the abdominal or thoracic viscera. Treatment consists of bichloride of mercury and potassium iodide in increasing doses and carbolized vaselin locally.

Jullien [24 Mar.4,'94] reports a case of late secondary lesion of the tongue in a man, aged 31, apparently in good health. The anterior fourth was the seat of a fissure, and there was a spot, the size of a franc piece, on the right side; on the other side were fissures and cracks with a yellow centre, the size of a pea. There was no true induration or glandular involvement. For a long time the patient could not eat solid food, and speech was much interfered with. He had been the rounds of the clinics, had been variously treated, had gone to baths, and used frictions, without avail. The question of tuberculosis, of diabetes, and of epithelioma being settled negatively, by careful tests in the author's hands, the diagnosis of syphilis was decided upon. He gave a history of syphilis some years previously, and had been treated for it for over six successive years.

TERTIARY SYPHILIS.

Brown [245 Mar.,'94] describes a case presenting the initial lesion, headache, and sore throat, but lacking the general adenitis symptoms.

The wife miscarried in her first pregnancy. The second child was born dead and the third lived about a year. The patient now presents two painless exostoses of the frontal bones, almost symmetrical as to position, and especially peculiar in the absence of all pain. The author questions whether early treatment would prevent such late manifestations.

[It does not seem certain, from this description, that the case is syphilitic. The symmetry and the absence of pain are both unlike it.—J. W. W.]

Morrow [245 Feb.,'94] reports the history of a man whose testicle was removed for presumably tubercular disease. Four years later the same patient presented an inflammation of the remaining testicle and scrotum, two or three ulcers at the root of the penis extending down into the scrotum, one in the left inguinal region, and another on the left side of the scrotum. It was diagnosed as a case of tuberculosis, but, as a matter of precaution, mercurial plasters were applied and potassium iodide given internally. In a short time the inflammatory reaction had disappeared and the ulcers were almost healed. [There is reason to believe that, with the increasing precision in surgical knowledge and methods, a little overconfidence in diagnosis has developed, and that such cases as the above are more common than they should be. Theoretically, the differences between a tubercular and a gummatous growth in the testis are well marked; practically it is certain that they are often mistaken one for the other. The "therapeutic test" should usually not be omitted as a preliminary to castration, which it will not infrequently prevent.—J. W. W.]

In a series of lectures at the Saint Louis Hospital Fournier discourses upon various manifestations of tertiary syphilis. [100 Jan.4,'94; 55 Dec.9,'93] He claims that the third year is the period of most tertiary lesions, the second year being next. The proportion gradually decreases until the eighth year is reached, when it is the same as the first year. The author has seen two hundred and two lesions in one hundred and fifty-eight patients in the first year, the skin being the structure most often affected. Among the organs never infected by early tertiary syphilis are the lungs, heart, aorta, and rectum. General paralysis is a late manifestation. The cutaneous lesions present special characteristics, the predominant form being the ulcer, which is usually multiple and very rapid in its extension,

painful, inflamed, and rebellious to treatment. Associated with the cutaneous lesions may be fever of a high grade, continuous adynamia, the enfeeblement increasing gradually until the patient dies. Fournier has seen but three or four cases of what he calls "*syphilis sidérante*,"—a condition in which a very young person presents tertiary symptoms in the first year, with ulcers going on to rapid phagedæna, adynamia, and death. The cerebral manifestations are epilepsy, aphasia, and general cerebral syphilis, complicated by other accidents. Affections of the cord spread downward or upward and, fortunately, are rare, for they are generally malignant.

Apropos of tardy manifestations of syphilis Fournier [14] Apr.29,'94 cites cases in which the disease remained absolutely latent during periods varying from twenty-two to fifty-five years; that is, the period between the secondary and tertiary accidents was enormously prolonged. In one case a period of fifty-one years elapsed between the light secondary symptoms and the appearance of a tertiary lesion; the latter, diagnosed as syphilitic by Ricord, Nélaton, and Demarquay, was cured by the administration of potassium iodide. Four years afterward the patient suffered from an enormous tumor of the thigh, which Fournier diagnosed as syphilitic and which disappeared in six weeks under the influence of potassium iodide. What becomes of the infective organism of syphilis during this long period of latency is a mystery and will be a mystery until we are able to isolate that organism, or, at least, to inoculate some of the lower animals and thus study its action in the tissues, its mode of colonization, its powers of resistance and multiplication, etc. Fournier noticed that in every case this late appearance of tertiary symptoms followed a mild secondary stage in which the treatment was not sufficiently rigorous nor prolonged, but he does not wish to be understood to say that a malignant secondary period may not be followed by tardy symptoms. In treating these late manifestations the specific is the same; potassium iodide has the same effect here as it has in the tertiary symptoms appearing at the usual interval. In the face of these facts Fournier thinks that it would be the part of prudence, as one of his friends, a physician, has done for himself, to submit the patient to periodic courses of treatment with KI, merely as a preventive; but such a course, he admits, would be difficult to carry

out, as it is contrary to all custom. [There is absolutely no evidence that in these late phenomena the "infective organism of syphilis" plays an active part or is present at all. The non-symmetry, non-contagiousness, and non-inoculability of the tertiary lesions all go to show that it is neither in the blood nor in the tissues at the place where the symptoms develop. The essential cause of late syphilides is as yet undiscovered.—J. W. W.]

Fournier [164] Mar.1,May 31,June 7,'94 claims that phagedæna is more frequent in syphilis than in chancroids; in 137 cases noted by him 44 were chancroid, 22 chancres, and 74 tertiary ulcers. The latter is found on the face, nose, and extremities, on mucous surfaces,—chiefly the pharynx, soft palate, and nasal mucous membrane. The ulceration takes on many characteristics of color, form, and discharge, depending upon its situation, upon the irritation present, and the medicaments and dressings applied. Two general varieties are manifested by the tissues involved, as the superficial and the deep. The first generally follows a definite path,—the centrifugal,—zone after zone of ulceration forming, while cicatrization goes on *pari passu*. The second form of extension is known as serpiginous ulceration, and here also as fast as ulceration progresses in one direction healing takes place in the other. The perforating phagedæna commences by destroying the skin or mucous membrane; the cellular, tendinous, and fibrous structures are in turn invaded, though sometimes it is arrested by the aponeuroses, but, once eluding this structure, it invades the muscles, ramifies in all directions, and attacks the bones and finally the arteries. It is almost always acute, differing in this respect from the tubercular ulcer, which is, as a rule, chronic. The progress of phagedæna is often modified by divers causes. All irritants are liable to renew its malignancy; opposite influences tend to lessen its progress, while certain diseases certainly produce curious changes in the ulcerations. Cholera tends to heal them. Erysipelas is well known as a curative agent in such conditions, but cannot always be relied upon, for sometimes, instead of being salutary, it produces death. Phagedænic ulcers of both the superficial and deep varieties are often terrible, extending over vast surfaces and invading important organs, mutilating and destroying them. Especially important is the devastation upon the face, most often the nose, which makes these patients objects of horror, even to their friends.

The author relates a case illustrating the disastrous results that may accrue from the phagedænic process. A man had a tertiary ulcer of the nose which eventually destroyed that organ, and later the hard palate, the soft palate, and the turbinals,—the maxillary sinus and the pharynx becoming one large cavity. Finally the brain was affected; the patient became unconscious and was paralyzed in all four extremities, remaining immovable in bed like a statue. This condition lasted five months, until one day the patient became partially suffocated and vomited an enormous mass which had fallen into the pharynx. This mass proved the basilar process of the occipital bone, and from that moment consciousness returned and all his senses were re-established.

Scrofulous phagedæna [17 Aug.4,7,'94] is analogous and almost identical with that of syphilis, though it is relatively infrequent and little known. In a group of one hundred and five cases of lupus, but three were complicated by phagedæna. The ordinary scrofulous ulcers,—rupia, ecthyma, impetigo,—as well as tubercular lupus, may become the seat of extensive and deep ulceration. The skin is most commonly affected, especially the nose; the extremities are usually involved in their upper segments; the mucous membranes of the nose and of the soft palate stand first as seats of predilection. The genital organs are but rarely phagedænic. The disease not only affects the surface, but may also extend deep into the tissues, spreading both centrifugally and also in the characteristic serpiginous manner, and may progress very slowly,—even existing for fifty years, as in a case cited. It is essentially a disease of youth, usually seen from the fifteenth to the twenty-fifth year; it is also found in subjects presenting other symptoms of scrofula. The prognosis is extremely grave on account of the frightful ulceration, the tendency to recur, and the lack of any specific remedy.

Gummata may occur very early in malignant syphilis. In a case reported by Mauriac a gumma of the tibia developed on the forty-fifth day after infection. Many other cases have been added to the records of early gummatous ulcers and infiltrations, and in a case reported by Roussel [234 Oct.,'93] a gummatous ulcer appeared about ten weeks after the chancre, with an incubation of twenty-two days. Nine days later he was attacked with a fever, diagnosed rheumatic, which was associated with roseola and thickening of

the periosteum of the tibia, causing intense pain at night. About the tenth week the ulcer just mentioned was discovered on the roof of the mouth. It extended until the hard palate was perforated, the alveolus attacked, and several teeth lost. Despite treatment, the patient died about one year after the commencement of the disease. Of all the medications employed inunctions were the longest borne, but mercury in any form or administered by any method soon caused digestive disturbances so severe as to demand its suspension.

Parsons $\frac{242}{\text{Dec.,'93}}$ contributes two cases of syphilitic involvement of the nervous system. The first, a woman, had a chancre on the lip followed by an eruption. She was afflicted with hysteria at various times, with petit mal, with aphasia, confusion of ideas, and, later, with epilepsy, subsequently dying in the status epilepticus, the arm, hand, and pupil giving evidences of localization. The diagnosis of cerebral syphilis had been made and mixed treatment administered, but without avail. The second patient had a chancre on the penis, alopecia, and psoriasis, which promptly yielded to the biniodide of mercury. One year and a half after infection neuralgic pains developed in the cardiac, lumbar, and dorsal regions, with symptoms of locomotor ataxia, but clonus and knee-jerk were unimpaired. Locomotion became more difficult as the disease progressed. The bowels could not be controlled and there was retention of urine. The left leg was much worse than the right; with this condition was also associated melancholia. All symptoms gradually improved under antisyphilitic treatment until the bladder and bowels were again normal, and locomotion became less difficult, though not entirely normal at the time of report. Saprinovski $\frac{24}{\text{Jan.7,'94}}$ communicates the history of a case in which nearly all the frontal bone was necrosed. The forehead was covered with ulcers, bridged by narrow skin strips. There were gummatous cicatrices on the pharynx and ulcers and cicatrices on the legs. Iodine, mercurial inunctions, and local washes were ordered. Four months after the necrosed bone separated and healthy granulations filled up the cavity. The other ulcers healed equally as kindly under the specific treatment. Zeissl $\frac{57}{\text{Mar.4,'94}}$ reports three cases of gummata of the penis: the first was complicated by a gummatous bubo, the second had its origin from the blood-vessels of the glans, and the third arose from the vessels

on dorsum of the penis. In a fourth case there were gummata of glands and other late forms of syphilis in a man who, from his initial lesion, saw no manifestations for seventeen years, though he had taken no treatment but iodine.

Of 791 cases of syphilis with tertiary symptoms treated at the City Hospital, Copenhagen, Haslund [57 Dec.10,'93] claims that lack of treatment during the secondary stage stands as the chief cause; 231 had received no treatment whatever, 461 were only partially treated, and but 99 had pursued medicinal treatment to a cure. Among the special causes of gumma formation in syphilis, chronic alcoholism holds the first rank, while old age and infectious diseases are also to be mentioned. Of all cases in both sexes only 12 per cent. developed tertiary symptoms. The anatomical structures invaded were the skin (453 times), bones (212 times), nervous system (200 times), mucous membranes (151 times), and internal organs (47 times). The osseous system and mucous membranes were most often invaded in women, while the nervous system was the chief seat of infection in men,—probably due to the excess of alcohol and tobacco.

[Both the facts and the conclusions of this paper seem especially worthy of attention. They accord with the general experience of the profession, but they give a good basis for accurate answers to some of those questions which are constantly propounded by patients. They give, too, another argument—although none was needed—against the so-called expectant treatment of syphilis.—J. W. W.]

A case of syphilitic involvement of the testicle simulating carcinoma is reported by Alexander. [245 Jan.,'94] There was a history of a primary lesion, but no secondary stage. The patient took potassium iodide for a long period, commencing immediately after the diagnosis of chancre was made. In about a year a painful swelling appeared in the testicle, which went on to ulceration, lasting six or seven months. Four days after the administration of specific remedies the ulcer began to show improvement and eventually the testicle almost regained its normal size. Legueu [7 Nov.19,'93] records a case of syphilis thoroughly treated, but despite which a gumma appeared in the testicle,—the other testicle, cord, prostate, and seminal vesicles remaining unaffected. This tumor had lasted for three and a half years when first seen. Mixed treatment was

prescribed; but, as there was no amelioration in the symptoms, castration was resorted to. There was also associated a considerable hydrocele. From his personal experience, derived from 1501 cases of syphilis, Ehlers $^{996}_{\text{Sept.10,'94}}$ arrives at the following conclusions: Tertiary manifestations are found in from 12.4 per cent. to 22 per cent. of all cases. Secondary eruptions are found in 10 per cent. more cases among men than women, while tertiaries have no preference for sex. Tertiary manifestations occur most often in the first four years after infection, becoming extremely rare at the twentieth year. Lesions of the skin are most frequent; ulcerations of nose, tongue, palate, etc., second; and nervous diseases third; but, if cases of locomotor ataxia, general paralysis, etc., seen in nervous clinics, the nervous lesions take first rank. The great cause of tertiaries is absence of treatment: 43.64 per cent. of all the cases had never been treated by mercury, 40.37 per cent. had only submitted a single time to mercurials, and but 8.86 per cent. had been treated many times.

Hutchinson $^{806}_{\text{Apr.,'94}}$ reports two cases of gumma of the parotid and one case of chronic mastitis occurring in a man. The patient had syphilis for eighteen months. The left mammary gland became enlarged, hard, and painful, but suppuration was never threatened. Despite the use of mercury, under which the other symptoms disappeared, the breast did not respond until potassium iodide was given. The author treated a man, with his wife and child, for syphilis, the parents being given gray powder in 1-grain (0.065 gramme) doses three or four times a day and the child being treated by inunctions. One year later all were hearty and gave no distinct traces of the disease. He also gives plates from skulls in the Dupuytren Museum to illustrate a case of syphilis with depressions of the parietal bone which occurred in the same situations in a case of his own. Another peculiar case was that of a boy of 10 years suffering from inherited syphilis with the usual symptoms, also choroido-retinitis in both eyes, hydrocephalus, and some mental defects. He gradually progressed in mental ability, but, though he could retain spoken words, yet music was learned by ear; he was interested in general topics, etc., but could not read. He gradually improved in general health and mental capacity, and the author hoped that he could eventually master reading as he grew older.

COMPLICATIONS.

As a curious symptom, the result of a syphilitic taint, Hutchinson [806 Oct.,'93] mentions profuse perspiration. A young man who had previously been treated by the author for syphilis was mentally worried and overworked and, though he was otherwise healthy, was troubled by profuse sweats upon the least exertion, and often would break out in the night soaking his clothing. [Syphilophobia or any form of neurasthenia may produce the same symptom. The relation in the above case seems questionable.—J. W. W.]

When first the doctrine was promulgated that a large percentage of cases of tabes dorsalis were due to syphilis, there was a wide-spread discussion and general opposition to the theory, but subsequent writings and statistics from all sources have established the fact, doubted by nearly every one in 1875. Fournier claims [479 Sept.,Nov.,'93; 24 Oct.,Nov.,'93] that as high as 75 per cent. of all cases are due to syphilis. He further attributes to the same disease, if not causation, at least association in the vast majority of cases of paralytic dementia. The symptoms are divided into muscular tremors, difficulties of speech, pupillary inequalities, psychical disturbances, melancholia, delusions of grandeur, etc., some authors claiming as high as 88 per cent. of syphilitic diseases in such cases. By way of proof he cites the relative frequency of paralytic dementia in men, the proportion of eight men to one woman being given by Ball. In his private practice the author has treated 15,000 cases of syphilis among men and only 1400 among women, making the relation about 10 to 1; so that, if the causation of dementia is attributed to syphilis, the relative infrequency of the latter disease among women would account for the increased frequency of the former malady among men. It is also a fact that paralytic dementia is rare in the rural districts; in certain countries, as Ireland, Scotland, etc.; and among ministers and Quakers, etc.; but it is also worthy of notice that, under the same conditions, syphilis is equally rare. Its occurrence in children the subjects of hereditary infection, the associated anatomical lesions, the small number of cases of ordinary insanity with syphilitic history,—all point to the undoubted etiological influence of syphilis in general paralysis. [The percentage of cases of tabes claimed by Fournier to be due to syphilis is about what, with smaller figures, my own

experience would warrant. There can now be no reasonable doubt of their extremely frequent, though not invariable, association.—J. W. W.]

In speaking of the relation of syphilis to general paralysis, Peterson [59 Dec.9,'93 ; 2 Jan.20,'94] refers to the great attention that has been directed to it in recent years, and quotes a list of twenty-two writers with the percentage frequency of syphilis found by them in their cases of general paresis. The numbers therein stated range from 17 per cent. (Kaes) to 70 (Savage), 76 (Mendel), and 88 per cent. (Bannister). The author's own investigations in 40 recent cases of general paresis showed that 10 of the patients were definitely syphilitic and 12 were non-syphilitic; in the remaining 18 the point was not determined. From examination of all the available data he concludes that a history of syphilis is found in about 65 per cent. of general paralytics; he notes, further, that antecedent syphilis is about eight times more frequent in paralytic dementia than in other forms of insanity. As to the etiological relationship between the two diseases, Peterson considers that syphilis does not act as a direct cause in the production of general paresis, but by its pernicious constitutional effects it renders the nervous system more vulnerable to the operation of alcoholic and other excesses. He mentions that, among the native Egyptians, syphilis is one of the most wide-spread disorders; yet no case of general paresis has hitherto been reported, nor was there any case in the asylum at Cairo when visited by him a few years ago,—an immunity that, he thinks, may be attributable to the prevailing abstinence from alcohol.

To the list of nervous diseases caused by syphilis, Dubit [55 Dec.9,'93] adds neurasthenia. The symptoms do not differ in any particular from the ordinary variety, and develop during the tertiary stage. It is possible that this neurasthenic condition is but the prodromal stage of general paresis, and not a characteristic neurasthenia.

Raynaud [479 Sept.,'93] describes a case of syphilis presenting symptoms of an eruptive fever variously diagnosed. There was no evidence of primary sore, but the tonsils were enlarged and the pharynx was hyperæmic. There were also alopecia, eruption, and profuse perspiration. Antisyphilitic treatment confirmed the diagnosis, as did also the subsequent complications. Treatment was intermittent and always of short duration. Hysteria, nocturnal head-

ache, and pulmonary congestion followed and were each in turn relieved by specific remedies, and finally a spontaneous fracture of the ninth and tenth ribs on the right side followed turning in bed. The cause of the fracture was attributed to gumma, and not to general infiltration of the bone. There was no inflammation whatever at the seat of fracture. Van Harlingen [119 Oct., '93] describes a patient with syphilis of eight years' standing, who presented severe skin lesions, no fewer than twelve gummata of the skin being present. He also suffered from periostitis of the right tibia, with swelling and pain in all the limbs. Mixed treatment improved his condition, but some time later he returned with painful hypertrophy of the liver and some mental disturbance. There was no jaundice or ascites. The author believes that visceral complications occur much oftener than is currently supposed, because of inability to observe these cases throughout the course of the disease.

Shoemaker [121 Nov., '93] details the differential diagnosis between secondary eruption, the lichens, psoriasis, and papular eczma, all of which may simulate each other very closely. He cites a case of syphilis in which primary chancre, or its scar, was not discernible, with sore throat, an eruption, and adenitis, but the eruption partook in many ways of the other diseases mentioned. This case resembles secondary syphilis by beginning with a sore throat, followed by a papular rash, which came out abruptly, but which has persisted and has resisted various plans of treatment; it is symmetrical and arranged in clusters. It differs from syphilis in the absence of a history, in the color of the papules, and in showing no tendency to be transformed, upon the genitalia, into condylomata. It simulates psoriasis by the presence of scales, which, however, are not as large as those of psoriasis; neither are they located upon a bleeding, excoriated base. The lesions have not enlarged peripherally and coalesced. Their distribution is general. The inflammatory fungoid neoplasm soon becomes a raw and vegetating tumor. Papular eczema is seated upon a red base, and vesicles and pustules are generally present in addition to the predominant lesion. The scales of squamous eczema are reddish in color. The lesions of lichen ruber are conical, hard, differ in color from those in this case, and the surface is infiltrated and cracks. When the eruption is plentiful the general health is deteriorated. The papules of lichen planus are quadrilateral and

flattened upon the summit, and are of a dark-red color; those of lichen scrofulosus have a yellowish or brownish-red hue. The patient was placed upon a mixture containing 1 drachm (4 grammes) of the iodide of potassium to the ounce (31 grammes), of which a teaspoonful was given every second hour. At the end of five days a slight, but nevertheless perceptible, improvement was noticed in the cutaneous lesions. Palmer $^{224}_{\text{Sept.23,'93}}$ presented a case before the Louisville Medico-Chirurgical Society with a serpiginous ulcer of the penis of over a year's standing. It had been healed over twice, with as many recurrences. There was also a sore in the right groin presenting phagedænic phenomena at the seat of a bubo which had been incised. The ulcer in the groin had been curetted and pure carbolic acid applied. Later protiodide was given internally and black wash, boric acid, iodoform, aristol, bromol, dermatol, peraseptol, acetanilid, tincture of iodine, etc., applied without avail. There was a history of syphilis, but the ulcers are diagnosed as chancroidal.

Hutchinson $^{806}_{\text{Jan.,'94}}$ believes that syphilis may be simulated by gout and rheumatism to such an extent as to render the diagnosis indefinitely uncertain. He gives several instances of sore throats diagnosed and treated as syphilis which not only did not yield to such syphilitic treatment, but also persisted for varying lengths of time almost unchanged. Again, periosteal nodes are also by no means as certain diagnostic signs as formerly supposed, as is shown by nodes following vaccination, small-pox, varicella, and typhus and typhoid fevers. He also reports a case of syphilis which presented ulcers on the legs with scars following, simulating very closely Bazin's disease, but in which syphilitic treatment was sufficient.

Pospjeloff $^{530}_{\text{v.40,p.904-912,'93}}$ publishes a case of syphilis with gummata of both testicles and polyuria, without any trace whatever of either sugar or albumin. There was a gumma of the thyroid cartilage and a sensation of chilliness was constantly complained of. Under mixed treatment the sarcocele, polyuria, and gumma of the thyroid disappeared, but the chilliness persisted. Morning high temperature developed, alopecia was manifest, and the nails were dry and cracked. The patient became apathetic, lost sexual desire, became dropsical about the face; the complexion became waxy, speech difficult, and sweating was arrested for two years. These symp-

toms of myxœdema were attributed to disturbance in the function of the thyroid gland. Thyroid extract was injected and excellent results almost immediately obtained, but, despite this and anti-syphilitic treatment, the sclerosis of thyroid remained, and for that reason the author believes that the cure is but temporary. Tchistiakow $\frac{126}{\text{July 15,'94}}$ claims that during the latent period of syphilis there may be a benign diabetes characterized by the presence of a small quantity of sugar in the urine, the quantity of urine passed in twenty-four hours not being increased. With the exception of the sugar, the urine presents no abnormal constituents; alterations in the appetite are not marked and are in the direction of enfeeblement. The glycosuria is transitory and disappears with the advent of the secondary manifestations. The author attributes this change to alterations in nutrition.

Councilman $\frac{99}{\text{Sept.6,'94}}$ considers the testicle the most frequently affected organ in patients suffering from syphilis. There are two forms,—the gumma and a diffuse formation of connective tissue. This serves for diagnosis from tuberculosis, which primarily affects the epididymis and extends upward along the cord to the seminal vesicles and prostate rather than to the testicle. He describes the post-mortem specimen from a case of syphilis with diffuse inflammation of one testicle and multiple gummata of the other; there was also a gumma of the seminal vesicle, but the cord was not affected. There were gummata of the lung, kidney, and liver, endarteritis and amyloid degeneration throughout.

Jürgens $\frac{814}{\text{Mar.1,'94}}$ describes the post-mortem remains of a case of tuberculosis with syphilitic and polypoid complications: "The surface of both pleuras was covered with miliary granulations. The lungs presented a combination of tubercular and syphilitic lesions. Traces of old syphilitic manifestations were found on the surface and in the substance of the liver. The spleen presented the appearance of chronic splenitis, and the kidneys were the seat of fatty degeneration and chronic diffuse nephritis. The small intestine showed a number of ulcerations, some of which, from their circular form and irregular margins, were apparently tubercular, while the others presented all the characters of syphilitic ulcers. There could be no doubt that the patient was at the time of his death suffering from chronic syphilitic enteritis. Polypoid vegetations about the size of a cherry were observed in the ascend-

ing and transverse colon, while masses of cauliflower excrescences about the size of an apple were found in the descending colon. One of these masses, which was situated on the limit between the sigmoid flexure and the rectum, might have been mistaken for a villous carcinoma. On microscopical examination, however, it was found that these tumors were simply polypoid growths similar to those occasionally met with in other parts of the body, *e.g.*, the bladder, where they sometimes attain a large size without ever assuming a malignant character."

TREATMENT.

King [9 Aug.25,'94] advocates excision of the primary sore for the following reasons, viz.: (1) when excised within a few hours after its appearance, it will abort the disease; (2) excision of an unhealed chancre will moderate the subsequent secondary manifestations; (3) it is the cleanest, least painful, and most scientific method of treating the initial lesion. The forcible spray of hydrogen peroxide was found satisfactory in the treatment of chancres by Wooster, [245 Feb.,'94] iodol-powder being dusted on the sore subsequently for protection. Lang [169 Jan.,'94; 80 Feb.15] holds mercury and iodide as the unquestioned specifics in the treatment of syphilis. Sarsaparilla is also of great value, so much so that many cases treated in vain by the specifics recover in an astonishing manner when this drug is administered. In extremely feeble cases the best results are often obtained by paying strict attention to diet and hygiene, by administering sarsaparilla, and finally giving the specifics. He employs a strong decoction, the dose being 2 or 3 teaspoonfuls. The iodide of potassium is often given in unnecessarily large doses; in ordinary cases, from 4 to 30 grains (0.26 to 2 grammes) a day will answer. When it is necessary to be careful of the stomach, the iodides are given by the rectum, 15 to 60 grains (1 to 4 grammes) being dissolved in 8 to 12 ounces (248 to 373 grammes) of warm water, milk, or nutrient enema. In one case Lang administered the iodides subcutaneously in the form of a 50-per-cent. solution, using from 4 to 8 grains (0.26 to 0.52 gramme) a day. The pain incident to this injection may be avoided by incorporating codeine with the iodide in the proportion of 1 to 2 parts to 100. Mercury acts unfavorably in cases of cancer, tuberculosis, malaria, or degenerative processes in

general. The hæmorrhagic diathesis is also exaggerated by this drug. Exceptionally even very small doses of mercury produce fatal poisoning; two or three rubbings have produced sloughing and ulceration of the bowel and death. Attention is also called to the chronic form of mercuric intoxication characterized by alteration in the nervous system. Even acute mercuric poisoning can occasion similar alterations. In some cases paralysis developed, in others polyneuritis. Pills of protiodide, calomel, bichloride or potassium iodide may be given, but should be freshly prepared. The inunctions afford an extremely powerful means of influencing syphilis, although they are open to the same objection which obtains against dosage by the mouth,—*i.e.*, the quantity absorbed is never definitely known. It is probable that a certain amount of mercury remains *in loco* for some length of time and is gradually taken up. It is difficult to account on other grounds for stomatitis developing weeks after the cessation of the inunction cure. Absorption is equally uncertain in hypodermatic injection. Unfortunately, most of the injection masses are so composed that the active principle, being heavy, sinks to the bottom, and, as Ullmann says, often a difference in strength of 90 per cent. occurs between two injections of the same bulk. The author uses 50-per-cent. gray oil, of which he injects at one time 0.05 gramme ($\frac{7}{8}$ minim) and repeats the injection at intervals of three or four days. He selects the subcutaneous tissues of the interscapular region, as in the gluteal region there is danger of striking veins. His first injection is made at the base of the neck, an inch to the left of the middle line; each following injection is made an inch lower down until six are placed, when the skin on the other side of the central line is employed in the same manner. As a first treatment from eight to twelve such injections are required. Recurrences require from four to eight. Exceptionally, more than twelve injections may be needed. In this case the tissues are selected further to one side of the line of the vertebræ. [It is most unlikely that sarsaparilla is of any real benefit in syphilis. It is not true that mercury given properly acts prejudicially in tuberculosis; on the contrary, there is some reason to think that in many forms of this disease it is of benefit. Its alleged effect in cancer, malaria, and the hæmorrhagic diathesis, and its evil influence on degenerative processes generally are probably purely

imaginary. Given in toxic doses it may, of course, do any patient harm; but, given with due attention to the hygiene and the susceptibility of the individual, the co-existence of any of the aforementioned diseases need not be considered, so far as the mercury is concerned. It has taken the laity more than half a century to get over the prejudice excited by the early use of the drug in poisonous doses. It is not worth while now to encourage in the profession an unfounded dread of it.—J. W. W.]

Lang [15 Nov.12,'93] opposes the treatment suggested by Fournier and claims that relapses occur earlier and in a graver form than by other methods of treatment. Further, the continued treatment leaves the system in such a condition that, when relapses occur and when the patient needs its action most, mercury will not produce the desired effects. Wickham [55 Jan.20,'94] considers that five to six months are long enough for the system to become accustomed to the use of either mercury or potassium iodide. For this reason the prolonged treatment should always be intermittent. If a patient present himself with the system tolerant to mercury or iodide, complete suppression of the specific remedy should be enforced for from two to three weeks; then the mercury should be resumed in large doses—larger than previously prescribed—and given in another form and by another way. The interval of rest should be employed in the use of tonics, hygiene, local treatment, laxatives, purgatives, etc.

Kaposi [319 Apr.14,'94] disapproves of Fournier's *traitement successif* of syphilis,—*i.e.*, continuous medication for two or three years with mercury and iodine alternately. He thinks that most patients are perfectly cured and capable of begetting healthy offspring after one course of treatment extending over several months, or else divided into two smaller annual courses, and, moreover, considers that the enormous amount of syphilitic pain and nervous disease in France is quite possibly the result of too protracted treatment. There is also the mental side of the question to be considered. Patients subjected to so long a treatment are constantly haunted by syphilophobia, and form a large contingent of the lunacy cases. According to Kaposi the primary treatment should be long and careful, but should not be repeated unless really unmistakable symptoms of syphilis re-appear. He looks upon syphilis as a curable disease. The prognosis is more favorable than in phthisis

or chronic alcoholism. All so-called "preventive cures" are injurious; in such cases the course is, as a rule, atypical, and severe forms of the "late type" set in early.

[I do not think there are any facts which justify the above dangerous teachings. To permit patients to marry after a course of treatment "extending over several months" would be most unjustifiable. The assertion that pain, nervous disease, and insanity are due to hydrargyrism is a pure assumption, whether made in reference to France or to any other country.—J. W. W.]

Jullien [24 June 3,'94; 26 Aug.1,'94] shares the views of Diday, and thinks that mercury should be administered to people suffering from the disease as soon as the diagnosis is established. He is convinced that secondary symptoms are thereby retarded and very considerably attenuated. The mode of treatment which he adopts has yielded such excellent results that he is induced to look upon it as well-nigh a perfect cure. This treatment, which is not a novelty, seeing that Scarenzio, of Pavia, recommended it in 1864, consists in the subcutaneous injection of calomel. The advantages conferred by asepsis remove all objection to its employment. Jullien makes use of a solution of calomel in petrolin, and, when the patient is robust, injects each time 0.10 gramme (1¾ grains) of calomel in 1 cubic centimetre (15½ minims) of the petrolin. This amount may be diminished by half, in accordance with age, strength, weight, etc. The site chosen for the injection should be as near as possible to the syphilitic lesion, but the hip and the shoulder are especially mentioned as suitable. The injections should be repeated every fifteen days during two months; after that the intervals should increase to twenty, twenty-five, and thirty days. The dose may then be diminished, unless complications forbid. When this method of treatment is carried out antiseptically the drawbacks are reduced to a minimum. The chief objections are headaches, occasionally a tendency toward syncope, and a feeling of thoracic constriction which it is difficult to understand. Preliminary investigation of the condition of the kidneys is essential, and the state of the gums should be carefully supervised. Hutchinson [806 Apr.,'94] recommends the small-dose suppression treatment for the reason that it does not entail any interruption of the patient's avocation. He administers 1 grain (0.065 gramme) of gray powder with $\frac{1}{10}$ grain (0.006 gramme) of opium six times a day.

For the cure of constitutional syphilis, in its gravest forms, Ziemssen [4 Sept.3,'94] recommends the "forced cure," by which he means inordinate doses of mercurial ointment, one patient requiring 170 ounces (5300 grammes) of a double-strength ointment for the repeated cure of obstinate symptoms. Potassium iodide is to be used in equally-large amounts when the indication offers.

The line of treatment pursued by Baird [81 Jan.,'94] consists in the administration of the "sheet-anchors"—mercury and potassium iodide—combined with regular exercise, good diet, warm clothing, and a hot bath every three days. If the patient is cachectic or debilitated, iron, quinia, strychnine, and phosphorus can be given. Treatment begins by inunctions of mercury with the occurrence of the eruption, and is continued for six months, followed by the mixed treatment for eighteen months; and if, after two years, an interval of one year elapse without the occurrence of symptoms, the patient can safely marry. Jones [43 Aug.,'94] uses a combination of the iodide of mercury, tincture of iodine, and potassium iodide for internal medication in constitutional syphilis.

Deutsch [116 July,'94] would commence treatment in the first stage of syphilis, claiming thereby to lessen, if not completely hinder, the involvement of the nervous system. Fox [139 July,'94] claims that errors in treatment of syphilis arise from the belief that syphilis is an incurable disease. Another fallacy is that a certain definite time is requisite for the cure of syphilis; but, as the disease varies, so must also the treatment. He thinks the time will come when we will not lean so heavily toward the use of mercury as we now do.

Lesser [214 Feb.1,'94; 26 Apr.2] advances the following formulæ for the treatment of syphilis: 1. Leaving aside certain exceptional cases, the general or specific treatment of syphilis should begin as soon as the appearance of secondary manifestations has settled the diagnosis of the given case beyond any doubt. So long as the chancre's nature remains doubtful the treatment should be abstained from. 2. As Fournier justly teaches, the specific treatment must be continued (with occasional free intervals, of course) during the whole secondary period,—that is, for about three years (the so-called "chronic intermittent treatment"). 3. Speaking generally, *cæteris paribus*, the best methods of treatment appear to be afforded by (*a*) mercurial inunctions and (*b*) subcutaneous injections of insoluble mercurial compounds. Of the latter, salicylate

of mercury is, perhaps, the most suitable. 4. With regard to certain secondary manifestations (such as lesions of locomotor apparatus, ulcerative papules of the oral, lingual, and faucial mucous membrane, etc.), iodide of potassium proves to be far more efficacious than mercurials. As a rule, it is sufficient to administer internally from 1 to 2 grammes (15½ to 31 grains) daily. In severe cases, however, larger doses are decidedly indicated.

[With the exception of the first proposition, there is certainly good reason to dissent from all of these. The intermittent treatment is not, in the opinion of many syphilographers so efficacious as the continuous. The administration of mercury by the mouth still holds the first place as regards practical usefulness in the great majority of patients. Iodide of potassium is rarely to be preferred to mercury during the secondary stage, and hardly ever to the *exclusion* of the mercurial treatment.—J. W. W.]

Mauriac $\frac{100}{\text{July 5,26,Aug.2,'94}}$ insists upon the importance of the auxiliary treatment of syphilis when associated with other diseases. In scrofula mercury is not advisable, but potassium iodide is of undoubted value and can be given with codliver-oil. For associated herpetic or arthritic diseases, arsenic is indicated. Hygiene plays a very important rôle in the cure of this disease; good food is especially advised, and the two great enemies of the syphilitic are alcohol and tobacco. Attention should be given to the internal organs and to the nervous system as well as the general *morale*. The treatment of women and of the old varies but little from the ordinary method. Menstruation and pregnancy are the two principal conditions to hold in view. It is not necessary to suspend the use of mercury at the catamenial period, but if there is an excess of blood the iodide should be stopped, as it produces an hyperæmia of all the mucous membranes. During pregnancy specific treatment is well tolerated and often requires to be pushed short of intoxication for the good of both the mother and the child, close watch being kept upon the kidneys, suspending treatment at the first sign of albumin. For the aged, as for infants and for anæmic and debilitated women, the auxiliary treatment by tonics, good hygiene, change of air, sulphur-baths, attention to the mouth, stomach, and, above all, the kidneys, combined with the ordinary specific remedies, constitute the best means of a successful cure. Potassium iodide is not only indicated in the tertiary

stage, but even in the first, when the chancre is very indurated or is ulcerative or phagedænic; also in initial cachexia of the second stage and the later manifestation. The dose varies from 10 grains (0.65 gramme) a day with timid practitioners to 1000 grains (64.5 grammes) a day, as was given by Puche. The minimum dose should be 30 grains (2 grammes) daily for men and 15 grains (1 gramme) for women. Below this amount the therapeutic results are doubtful, insufficient, or *nil*. The iodide should rarely be given save by the mouth, but when this is impossible an enema combined with laudanum can be given by the rectum. The treatment by hypodermatics does not find favor with the author, though in severe cases, where essential organs are threatened, he would employ calomel after the method proposed by Scarenzio.

[The advantages of the early use of the iodides, which has been advocated by several writers during the past year, do not seem to me to be apparent. I am unfamiliar with any good reason for giving it "in the initial cachexia of the second stage." I agree with Hyde, who says: "A coarse test of any physician's expertness in the management of syphilis is to be found in his use of the iodides," most general practitioners hastily employing them at a time when the specialist finds no indication for their use.—J. W. W.]

Among the various preparations of mercury employed for hypodermatic injection Wolff $\frac{202}{\text{Apr.25,'94}}$ claims the best results from a 30-per-cent. gray oil. The chief objection to this method of treatment, in the author's opinion, is the liability to recurrence of the symptoms, especially with the soluble compounds; this, however, is lessened when the oil is employed. The method of administration consists in injecting 0.01 cubic centimetre ($\frac{1}{6}$ minim) every week for the first four to six weeks; two places injected each time with half the amount give better results. All injections are made in the back, beneath the skin, about one inch from the median line. Among the other preparations employed are bichloride, calomel, yellow oxide, black oxide, and salicylate of mercury prescribed in vaselin-oil and lanolin. In cases where the symptoms are urgent Wolff injects $\frac{1}{4}$ grain (0.015 gramme) of the sublimate, at first daily, then every other day, until 25 injections are given. If, after this, all symptoms have not entirely disappeared, he resorts to the gray oil, 0.1 cubic centimetre ($1\frac{3}{4}$

minims) of the 30-per-cent. solution, injected in one or two places, once a week, until six or eight injections have been made. If further manifestations appear, gray oil should again be resorted to and continued until long relapses between treatment show no further symptoms. Horwitz [80 May 15,'94] believes that hypodermatic injections of sublimate give rise to trifling pain, but do not produce callosities. The gray oil, however, does produce indurations, is also painful, and is more dangerous than the bichloride. Abscesses and ptyalism are rarely produced, but there is a great tendency to relapses by the hypodermatic method of medication, which should not therefore be employed for routine treatment. When a rapid impression is desired it affords one of the quickest means of mercurializing the patient.

Chéron [164 Oct.12,19,26,'93] states that among the advantages and disadvantages of the subcutaneous injections of mercury may be mentioned the practical advantage gained in the rapid progress of treatment, the suppression of fraudulent practices, economy in lessened visits to the doctor and a greater facility of guarding the patient's secret. The relief afforded the skin and stomach is especially appreciated by the medical profession living in warm climates. The absorption is more rapid and certain than by inunctions, though at times the injection may become encysted. Nutrition is beneficially affected. Recurrence occurs about equally in any of the methods of treatment employed. The inconveniences are classed under two heads: (1) those common to all methods of administration; (2) those due to the injection. Stomatitis occurs with about the same relative frequency. Digestive troubles are rare. The pain of the injection is one of the greatest disadvantages. The gray oil seems to cause less pain than most of the preparations. Insoluble salts may cause pain a few days after their administration and also produce indurations, especially in fat women, or they may go on to abscesses. Lesions of the kidneys, embolism of the lung, and mercurial poisoning followed by an intense diarrhœa and death are among the graver sequelæ of this method of treatment. Fournier claims there have been twelve reported deaths; therefore, the author believes that injections of insoluble mercurial salts are contra-indicated except when all other means have failed or in cases of cerebral syphilis. Soluble salts may be employed in cases where the intestines are

affected by the other methods, in refractory cases, and when it is necessary to apply all the known methods at once to avoid grave complications of important organs. The liquid injected should be chemically and physically pure, and the mercury injected deep into the muscular tissue. Fournier suggests three places: (1) three centimetres behind the great trochanter, (2) lumbar region, and (3) the buttock. Veins, if possible, should be avoided, and the locality at the point of injection, as well as the needle and syringe, sterilized. Morrow [102 Mar.,'94] condemns the use of hypodermatic injections and considers inunctions best and least liable to lead to complications. He combines them with hot baths.

Augagneur [14 Aug.8,'94; 99 Sept.6] strongly objects to the hypodermatic treatment except where there is an urgent demand for quick absorption, as in cerebral syphilis; in other cases inunctions or pills should be given. He grounds his objections on the great pain, the dangers of abscess-formation, sudden death from syncope, fat embolism, and rapid mercurial intoxication. Stoukovenlow [22 Nov.15,'94] has employed the hypodermatic method with success and strongly recommends its use. He employs neutral benzoate of mercury as follows: Benzoate of mercury, 5 grains (0.32 gramme); chloride of sodium, hypochlorate of cocaine, each 1 grain (0.065 gramme); in distilled water. Two Pravaz syringefuls of this solution are injected each day for a month into the gluteal region, as soon as the secondary symptoms appear. After two months' suspension another series of injections is given, to be followed by a rest, and then a fourth and fifth series with an interval of six months. He has practiced, in all, two hundred thousand injections and has never met with any serious accident. Monteis [827 Jan.10,'94] employs calomel for injections in a vehicle of soft soap made from caustic soda and potassium and oil of almonds. It makes a good substitute for the Neapolitan ointment. Gyselynck [454 June,'94] made use of hypodermatic injections of calomel in olive-oil for the treatment of soldiers afflicted with syphilis. Deep injections were made into the gluteal region once in eight days, four or five injections being sufficient to terminate the treatment. Linden [116 Aug.,'94] tried calomel and salicylate and thymolate of mercury by hypodermatic injection, and claims that, though calomel acts the most rapidly of the three, it is more irritating, and that the salicylate and thymolate tend more to shorten the duration of the disease. Lambkin [239 Jan.1,'94]

recommends a mercurial cream,—a compound of mercury, lanolin, and 2-per-cent. carbolic acid. In a thousand cases treated by deep injections of this cream he observed no pain, abscesses, salivation, or any other inconveniences. The cure lasts from two to eight months.

As a result of the analysis of thirty-six letters from syphilographers in Europe, Wolff [80 May 15,'94] formulates the following conclusions: Hypodermatic injections are largely used in Europe with the exception of France. Sublimate is preferred, calomel, salicylate, and yellow oxide following in the order named. Soluble salts are preferred to the insoluble. As to rapidity of action and permanence of effect, calomel holds the first place. The period of time in the treatment is not limited, but should continue until the disappearance of symptoms. The disadvantages are not so frequent or serious as formerly supposed. Hypodermatic medication is established on a firm basis and should be continued.

[There can be no question of the *occasional* usefulness of hypodermatic medication in the mercurial treatment of syphilis. There are times when a rapid and powerful effect can be produced in this way to great advantage; but the early claims of some of its more enthusiastic supporters—viz., that it was by far the best routine method; that, by a certain given number of injections, syphilis could be "cured"; that the line of treatment could be greatly shortened; that the accidents were fewer and the accuracy greater, etc.—seem to be losing ground steadily in the estimation of the profession. In America it has never come into wide-spread or general use and does not seem likely to do so.—J. W. W.]

Steinbrecher [185 June,'94] considers that inunctions, judiciously applied, meet every indication in the treatment of syphilis. Mercury kills the virus of syphilis directly; iodine aids in its elimination. These, combined with hot baths, constitute the therapy of syphilis. Internal medication is the least efficient of all. Hypodermatic injections are open to many objections, yet are to be preferred to medication by mouth. He gives inunctions for four or five months, allowing one month's rest; goes on again for two months, rests again for a month, and continues treatment for four months; this consumes about a year. Van der Spek [583 v.2,No.2,'93; 116 Jan.,'94] states that inunctions are indicated when a strong action of mercury is wanted, as

in obstinate lesions, palmar psoriasis, glossitis with tendency to sclerosis, sarcocele, eye, brain, and spinal involvement. When a quick action is wanted hypodermatics are best, and insoluble salts should only be used in grave conditions. During the latent period internal medication is adopted, and for children calomel is especially beneficial. At the sulphur-springs at Busko, in Poland, Dymnicki [57 Mar.25,'94] combines inunctions of mercury with sulphur bathing, and reports rapid recoveries. Brocq [245 Jan.,'94] claims that to give, at the same time, sulphur-baths and mercury is veritable nonsense, for, in organisms capable of supporting mercury, the elimination of the medicine is accomplished so extremely fast that the organism is in no wise impregnated. We must, on the contrary, let the sulphur treatment follow the specific cure. In this way we get out of the mercury all it can give in this coming and going, as it were. We establish in the organism, from without inwardly, medication by mercury alone and, from within outwardly, sulphurous medication alone,—medication of elimination. Sulphurous waters can then render immense service in severe and rebellious cases, permitting of a cure by mercury and causing habituation to the drug to cease. When the ground has been, in a way, renewed by the sulphurous washings, a new antisyphilitic treatment may triumph over accidents which had previously resisted all medication.

The use of mercury by inunctions, according to Cathelineau, [360 July,'94; 2 Aug.18] is recorded as early as 1259, and in 1494 Meichinger recommended it for the new malady called the "Neapolitan disease." The value of this treatment is unquestioned, and various views have been put forward to account for it. The effects have been attributed to (1) the passing of the drug through the skin, (2) the formation of soluble and absorbable compounds, (3) the penetration of mercurial vapor formed in the follicles and sebaceous glands, and (4) inhalation of the volatilized mercury. Volatilization of mercury is possible even in the solid state, and the diffusive power of the vapor is great. A patient subjected to these inunctions lives in an atmosphere of mercury. The author says that patients living in a ward among other patients who are being treated by mercury show the presence of mercury in the urine. Papers of ammoniacal nitrate of silver left in such rooms also indicate the presence of mercury. These facts explain the

good results obtained by putting patients in closed rooms saturated with mercurial vapor. If mercurial inunction is used in severe cases, it should be washed off, with the aid of soap, on the following day. The author shows by experiments that the amount of mercury passing off in vapor is greater from hydrargyrum cum creta than from mercurial ointments, whether made up with vaselin, lanolin, etc. He also found that the amount of mercury present in the urine of those subjected to inunction was greater than that given off by the mercurial preparation; hence, the lungs are not the only route by which the mercury is absorbed. An average dose of ointment is 1 drachm (4 grammes), but this dose may be doubled or trebled in grave manifestations. The author concludes, from his experiences in the use of sulphur-baths, that the ordinary bath neutralizes the mercury by forming an insoluble sulphate. He would say, from analogy, that the hot sulphur-baths act in the same way, though the experiences of those at the thermal stations contradict this opinion. Baths following a course of inunctions, especially if a long or short time have intervened, cause a rapid elimination of the mercury.

[The use of inunctions has not been sufficiently insisted upon in the routine treatment of syphilis. The more cases I see, the more value I place upon both the constitutional and the local effects of inunction. It is well to interrupt the dosage by the mouth once in every six weeks and give a course of inunction, using ½ drachm (2 grammes) of mercurial ointment night and morning. In many dry, scaly, or crustaceous syphilides the local use of some ointment containing mercury hastens their disappearance; and, even in the later stages with the involvement of deeper tissues, the combined use of inunctions over the affected region, with potassium iodide internally, often seems to have distinct advantages, as compared with the administration of the "mixed treatment" by the mouth.—J. W. W.]

Baillon [814 Dec.,'93] lauds the use of succinimide of mercury, both in pill form and hypodermatically, claiming that it never produces stomatitis and only gives rise to digestive disturbances in cases where mercury in any form would do the same. In pill form it is administered in $\frac{1}{20}$- to $\frac{1}{30}$-grain (0.003 to 0.002 gramme) doses, two to three times a day. Subcutaneously it is injected in $\frac{1}{30}$-grain (0.002 gramme) doses and causes less local reaction than

any other salt of mercury, but in exceptional cases of pain it may be combined with cocaine. Deep injections into the buttock are best. The greatest disadvantage is the comparatively immense results from such small quantities injected; twenty injections constitute an ordinary treatment. McClintock [430 Apr.,'94] also testifies to the prompt action of and the freedom from intestinal complications in the use of the succinimide of mercury, but he found it so painful that he was obliged to incorporate cocaine in his injection fluid.

Baccelli [19 May 19,'94] treats syphilis by intra-venous injections of sublimate, using a daily dose of 1 cubic centimetre (15½ minims) of a 1 to 1000 solution.

Gillette [62 Mar.,'94] describes the calomel plaster employed by Quinquaud in the treatment of syphilitic children. The formula consists of diachylon plaster, 3000 parts; calomel, 1000 parts; and castor-oil, 300 parts. This is spread upon bands and applied to the chest or abdomen, previously cleansed. Nothing beyond a slight maceration of the skin occurs, despite the fact that each pad is left in place for eight days; when changed, a new site is selected and an outside dressing is applied to hold it in place.

Morton [157 Feb.,'94] describes the various methods of administering mercury and potassium iodide. To these specifics he adds in selected cases: codliver-oil, iron, strychnine, arsenic, and erythroxylon coca. Hygienic and climatic surroundings should receive due consideration.

Silbermünz [109 Apr.,'94] employs the calomel soap recommended by Watraszewski. In ordinary cases he uses a 25-per-cent. "or mild or neutral soap," ½ drachm (2 grammes) being rubbed in daily. In obstinate cutaneous or glandular lesions he employs a 33-per-cent. (1 part of calomel to 2 parts of the mass), the daily quantity varying from 10 to 15 grains (0.65 to 1 gramme).

Grizun [21 Aug.11,'94] employs a mixture of calomel, coca-butter, lanolin, and lard for inunctions; also a mixture of calomel, 1 part; and potassa soap, 2 parts. Both the ointment and the soap are feeble methods, and find their indications where an energetic mercurial action is not desired.

Tommasoli [69 Nov.15,'93] employed the serum of animals for the cure of syphilis; thirteen prostitutes were injected with the serum derived from the blood of sheep and calves. No other treatment was administered. In each case the symptoms rapidly disap-

peared. In three cases ten hypodermatic injections were required, in one case nine; but in all the others but six injections were needed. In the most of them there were no relapses from the fourth to the tenth month after treatment. On the other hand, Kollmann, [116 Jan.,'94] having tried for four years to cure syphilis by injections of lambs' blood-serum without success, renewed his efforts on reading the unusual results obtained by Tommasoli. Eighteen patients were selected, and the results obtained did not alter his former opinion as to its value.

As an adjuvant in the treatment Menzies [2 July 7,'94] has employed thyroid extract with satisfactory results, both as an injection and a topical application.

Traumaticin, a 10-per-cent. solution of gutta-percha in chloroform, has been employed by Peroni [6 Sept.8,'94] as a convenient vehicle for the cutaneous administration of mercury in syphilis. He adds to it a quarter of its weight of calomel; and, after the patient has had a bath, the syphilitic patches, if there are any, are painted over with the liquid. If there are none the back is painted all over, and when the chloroform has evaporated the skin is left coated with a mercurial varnish, which adheres closely. This treatment is repeated three times a week until the specific symptoms have disappeared. In papular, pustular, and squamous syphilides a successful result may be expected in from three weeks to a month. Of course, general treatment can be carried on simultaneously; but in very weak subjects, or in such as do not bear the internal administration of mercury well, the traumaticin method is very suitable alone. It may also be employed in the case of children with hereditary syphilis and in late cutaneous eruptions.

Price [59 Feb.3,'94] has employed cupric sulphate for the relief of syphilis, and arrives at the following conclusions: Copper exercises a specific action in syphilis, which is especially directed toward the lymphatic system; and it is, for this reason, more powerful than mercury. Its action on secondary skin lesions is slow. It is a very active drug, and its use should be omitted one day in a week. The average dose is $\frac{1}{30}$ grain (0.002 gramme) thrice daily, better when given with sulphate of iron. In syphilitic cachexia much smaller doses should be given.

Hallopeau and Brodier [59 Feb.24,'94] claim that the use of di-iodoform

in simple chancre is attended with as good results as the use of iodoform, and that it is devoid of the drawbacks attending the use of the latter, particularly the smell. It is not irritating, and it should be dusted on several times a day.

The dietetic treatment employed by Kühner [189 Nov.24,'93] consists of general hygiene,—the water-cure and massage. Water is employed as a beverage and a gargle many times a day, 2 quarts (litres) being consumed in twenty-four hours, as a "half bath," with rubbing afterward, the cold pack, hot baths of steam or dry heat, hot foot-baths, dry packs, sweat-beds, etc. By way of diet, cooked fruit, vegetables, rice, gruel and milk, beef-broth, and meat are given in selected cases. Massage assists in dispersing the induration and assisting metabolism. Indurated glands are rubbed with sponges wrung out in cold water. He does not employ mercury in any form. [The coincident advantage of such a course to patients taking proper doses of mercury would doubtless often be very great. The question of its comparative advantage, when used to the exclusion of mercurials, has long ago been settled in favor of the latter.—J. W. W.]

Stern [100 No.74,'94; 19 Aug.4,'94] proposes, as auxiliaries in the treatment of syphilis, hygiene, bathing, and remedies directed against the associated anæmia, chloranæmia, and neurasthenia; the iron preparations and tonics are compatible with mercury and iodine and favor their action.

Dind [197 Nov.20,'93] considers "time" as the most active curative agent of syphilis, associated with good hygienic conditions. He, however, recommends injections of yellow precipitate, claiming that gray oil causes pulmonary complications. He describes a man who developed syphilis and presented tubercles in the left axilla and epigastrium. The recent ones were red rose in color, while the older tubercles were deeper shaded. A second case, in a woman, presented the symptoms of "galloping" syphilis at from three to four months from the time of infection. She developed large papules over the entire body; gummatous ulcers on thorax, nose, eyelids, etc.; paraplegia affecting especially the extensors, with muscular atrophy and other symptoms of degeneration.

The treatment of secondary manifestations is thus epitomized by Fournier [290 Oct.3,'93]: The treatment consists in external and internal medication. The chief internal medication is mercury, given by

inunctions, subcutaneous injections, and by the mouth. When the state of the stomach contra-indicates buccal administration, injection is the simplest method. The protiodide seems to be the best preparation, in doses of at least 1 grain (0.07 gramme) a day to men and from $\frac{1}{2}$ to $\frac{2}{3}$ grain (0.03 to 0.05 gramme) to women. Potassium iodide is indicated toward the end of the secondary stage or in malignant secondary manifestations.

The external treatment is quite remarkable for the number of plans resorted to. As to baths, where there is irritation, bran or starch may be employed. Sulphur-baths are too stimulating and irritating for most cases, while the vapor-baths cause weakness and anæmia. Sublimate-baths are useless where the skin is intact, and when the skin is denuded they are liable to cause intoxication. Fumigations, also, are relegated to the useless list on account of their danger and uncertainty, and are useful only in rebellious cases and in localized eruptions, as on the hands and feet; here they are efficient and without danger. Ointments are simple, as oil, cold cream, vaselin, etc., or modified with calomel, turpeth mineral, or red precipitate. The Neapolitan ointment in confluent eruptions, as upon the palms, soles, beard, and hairy parts, is especially efficient. Iodoform ointment deserves mention in ulcerations. Salicylic acid is also useful. Among the plasters, the old one of Vigo holds supremacy without, however, all the queer ingredients its author has recommended. Dusting-powders include bismuth, talc, and calomel, and are excellent in mucous patches of the skin, with Labarraque's solution for the patches on the mucous membranes. Silver nitrate and acid nitrate of mercury are also useful in mucous patches of the skin and in syphilitic vegetations. Rhagades respond only to Vigo's plasters or to cautery of the fissures with silver or the acid nitrate.

In the two special forms of syphilis—namely, psoriasis of the palms and the soles and ulcers—special treatment is required. In the light form of psoriasis it is sufficient to make daily inunctions, the patient wearing oiled stockings or gloves during the night. In the morning the part is washed with soap and anointed with glycerin and washed several times a day with dilute glycerin to avoid fissuring. In ulcerations the crusts are softened and removed by Vigo's plaster, and bandaged with lint soaked in Vigo's preparation, renewed every day or two. In increasing

ulcers, iodoform and cautery with tincture of iodine and silver nitrate will be useful.

For the treatment of condylomata, Warren [364 Feb.1,'94] uses a compressed tablet (Wilson's formula: $7\frac{3}{10}$ grains—0.45 gramme—sublimate; $7\frac{3}{4}$ grains—0.49 gramme—ammonium chloride), which he applies directly to the erasion; then, after exposing to the air for a short time, he covers with absorbent cotton and water-proof tissue-paper, leaving the dressing undisturbed for six hours. This causes a great deal of pain, for which an ointment of extract of belladonna and cocaine can be used. Gemy [19 Mar.17,'94] recommends, where the removal of acuminate condylomata is impossible, the local application of an astringent powder consisting of equal parts of salicylic acid and powdered sabina. Before its application the affected parts should first be energetically bathed with warm water, to which about 6 per cent. of Van Swieten's solution has been added. After the local bath they should be carefully dried with sublimated cotton before application of the astringent powder. He regards the acuminate condylomata as the product of a coccidium. Fournier [80 Aug.15,'94] advises, for the ordinary treatment of syphilitic phagedæna, when other means fail, application of iodoform covered in with cotton and rubber tissue. This is often unsuccessful, and, if so, caustics may be applied, though often these remedies are often followed by failure. Moreover, they are inapplicable when the ulcer is extremely large or when it is situated upon the face. Under such circumstances it is well to absolutely stop all medication for a time; then, after the patient's health has been restored, to begin again with specific treatment.

Leistikow [36 Aug.,'94] includes, under the name of "neurosyphilides," a number of syphilitic eruptions which have been hitherto classed together as roseola tardiva, roseola circinata, leucoderma, etc. These occur in circles, rings, gyrate and pigmented forms, are not infiltrated, are permanent, and react with difficulty to the ordinary antisyphilitic remedies. He records four instances, all of which appeared within the tertiary circle, in persons who had had a mercurial course. These, after resisting mercury and iodide, were cured in a comparatively short time by the local application of chrysarobin and pyrogallol, used in plaster or as lotions in spirit and ether in the limited patches and as ointment in the more widely diffused ones.

In the management of syphilitic married women, Fournier [1 June 2,'94] is of the opinion that whenever the physician is satisfied that a safeguard can be thrown around his patient only by his keeping silence, he is warranted in doing so, and in the case of an innocent wife the prerogative rises to the level of a professional duty. But when the woman is of loose morality reticence may become dangerous; such a patient should be warned that she is tainted with a contagious disease and told that it is incumbent on her to guard sedulously against spreading it. The best way is to suggest to the woman that her husband's co-operation in the necessary medication, etc., is desirable; if she assent she is innocent, but if she raise objections she is culpable. In any event, however, the physician should not confer with the husband without the wife's consent. It is true that to suggest such a conference may be to arouse suspicions and precipitate consequences that it is desirable to avoid, but, on the whole, this course is the least objectionable.

[It would be hard to get into a few words a better outline of a physician's duty in these trying cases.—J. W. W.]

In cases where there is undoubted syphilitic taint in the mother before her pregnancy, manifested by abortions or by previously-delivered syphilitic children, Diday [211 Dec.24,'93] would commence at once the specific treatment; but, where there is a reasonable doubt, the expectant method is the best.

To ascertain whether mercury passing through the kidneys irritates them and whether this irritation is temporary or permanent, Welander [245 May,'94] says that it is not only necessary to examine the urine for albumin, but also to search for casts. The albuminuria does not last as long as the cylindruria, casts being found four to six weeks after the cessation of mercurial treatment, while albuminuria disappears within a few days. Out of ninety-seven cases examined beforehand for casts with negative results, he found a few casts in thirty and a considerable number in fifty during the course of a mercurial treatment. In the treatment with pills casts are rare. Inunctions are frequently followed by cylindruria. The administration of potassium iodide during or after mercurial treatment does not increase the number of casts. It is always advisable to be particularly careful, in cases with affections of the kidneys, not to use a too vigorous treatment and to examine

repeatedly for albumin and casts. Bardescu [996 May 10,'94] claims that patients fumigated with cinnabar show evidences of mercury in the urine within the first two hours; further, the maximum quantity appears within this time after a fumigation with 20 grammes (5 drachms), 0.012 to 0.014 gramme ($\frac{1}{5}$ to $\frac{1}{4}$ grain) appearing, while at the end of twenty-four hours but 0.004 gramme ($\frac{1}{16}$ grain) could be found. The density of the urine is also increased. Lewin [336 June 7,'94] describes two cases of intoxication from the injection of salicylate and yellow oxide of mercury, respectively. He considers the use of insoluble salts dangerous for out-patient dispensaries.

CHANCROID AND BUBO.

Bacteriology.—A most complete and exhaustive study of the chancroid and bubo has been made by Dubreuilh and Lasnet. [25 Oct.,Nov.,'93] Ferrari and Mannino each had written concerning a specific germ in chancroidal pus as early as 1885, but it was not until Ducrey presented his memoir in 1889 that the bacillus was established as the specific cause. Having secured a culture from the chancroidal pus he made a series of inoculations upon men, under antiseptic precautions, and observed that the germs so numerous in the natural pus disappeared very rapidly after a few inoculations until a single pure culture remained, whose virulence continued indefinitely. He concluded that this microbe—which was only found in chancroid pus, which was found constantly, and which alone existed under experimental conditions—was the causative agent of the soft chancre. Two years later these results were confirmed by Krefting, whose first researches antedated the publication of Ducrey's memoir. In 1892 Unna discovered, in sections of a soft chancre, a bacillus, small, disposed in parallel chains, penetrating deeply into the inflamed tissues of the base of the ulcer. This streptobacillus he called the agent of the chancroid, but left open the identity of this bacteria with that of Ducrey. The authors who have followed, Quinquaud and Maurice Nicolle, Krefting, Audry, Petersen and Charles Nicolle, have affirmed the identity of the two bacilli, as do Dubreuilh and Lasnet, after a long series of experiments in the same line as both Ducrey and Unna. The bacillus is decolorized by the Gram method. It is found in all chancroidal pus, most often in the pus-cell itself or without the cell, in either irregular masses or in chains;

these chains, consisting of four or five series parallel with each other, constituted the differential point between Unna and Ducrey, but was explained by Nicolle's more careful technique. [303 July,'94] The stain best adapted for the streptobacillus is methyl-blue, carbolized or not, and cleared in aniline-oil with the addition of xylol. The bacilli force themselves, in chains, between the cells into the surrounding tissues, but the bacteria are not found in the cells themselves nor in the vessels or blood. Unna hesitated to identify his bacillus with that of Ducrey because the latter's was too large for its intercellular situation in the tissues and its intra-cellular situation in pus; besides, its occurrence in chains in the tissues was not observed by Ducrey in the pus, and the ends were described by Ducrey as rounded, while Unna observed them to be square-cut. Subsequent observers have finally settled the doubt raised by Unna. The streptobacillus is a small short rod 1.5 μ to 2 μ long, the width being one-fourth of its length. When isolated, as in pus, its ends are rounded; when seen in chains, either in pus or sections, its ends are square. The bacilli as well as the chains, upon close examination, appear striated. This is due, according to Krefting, to segmentation, but it is more apparent in preparations of methylene-blue than in those stained by gentian-violet. Heat applied for some minutes at a temperature of 40° C. (104° F.) destroys their virulence. This fact was made known by d'Aubert, and since then heat has been proposed for the treatment of chancroid by Arnozan. A tube of cultures placed in water at 38° C. (100.4° F.) for five minutes was still capable of inoculation, but one placed in water at 40° C. (104° F.) gave no result from the inoculations.

Ducrey, by inoculation, was able to secure from ten to fifteen pustules; Guyon, on the other hand, could obtain but one; other authors varied between these two, but Dubreuilh and Lasnet secured as high as eighty generations, in this according with Ducrey. Ricord first remarked that inoculations from bubo-pus, made immediately after opening, seldom gave pustules, but that the same buboes later became virulent; and Strauss, in 1884, declared that the bubo was not the seat of microbic infection, but that the inoculation came from outside sources. The following year he modified this statement somewhat by saying that *certain* buboes were virulent without external inoculation. This was con-

firmed by the authors during the epidemic of chancroids at Bordeaux, commencing January or February, 1893, chiefly occurring among men and licensed prostitutes, but few non-licensed women being affected. Among this number of patients there were 136 buboes: 27 were absorbed without incision, by means of rest and moist dressings; 43 were opened and did not become infected, proven, for the most part, by cultures remaining sterile; 51 became subsequently infected, though sterile when opened; 12 opened spontaneously before admission, all being virulent; 3 were primarily virulent, and from the first gave pustules upon inoculation. This confirms Strauss's opinion that primarily infected buboes are rare (2.2 per cent.).

The presence or absence of the streptobacillus was sought for in every case. When the pus was virulent and produced a chancroid by inoculation, it always contained the bacillus of Ducrey in greater or less abundance. When inoculation was negative, microscopical examination was equally so. It is a significant fact that in most of the cases the streptobacillus was the only germ to be found in the pus of the buboes or in the pustules resulting from inoculation; also that the moment the virulence disappeared other microbes, as the staphylococcus pyogenes or saprophytic bacilli, were present, and continued so until healing was complete, probably due to the difficulty in sterilizing the skin.

The authors divide buboes into three classes: Inflammatory, secondarily infected, and primarily virulent buboes. The latter are caused by the streptobacillus being transported by the lymphatics, and, when arrested in the glands, causing a purulent adenitis, thus placing this bacillus in the pyogenic group. The simple inflammatory bubo is primarily caused by the irritant action of the pyogenic toxins. Scheiniss $\frac{586}{\text{No.48,'94}}$ claims that the short rod-bacillus of Ducrey is the specific cause of chancroid. An injection of pus from a bubo only yields positive results when it contains the Ducrey bacillus. Besides this specific microbe there are other bacteria whose influence as a specific cause it is not safe to affirm.

Spietschka $\frac{336}{\text{Sept.15,'94}}$ believes that the bacteria which cause the chancroid is not yet definitely decided upon, although the evidence in favor of Ducrey's bacillus is increasing. He has found the bacillus in sections, but only in the necrotic part of the ulcer, and

not in the infiltration. The etiology of the bubo is also not clear. Strauss maintains that the bubo of chancroids is not primarily virulent and that it becomes infected from without. This hypothesis has met with much opposition, and chiefly by those who claim that most of the suppurative buboes are the result of a mixed infection. The author experimented upon forty-six buboes following chancroid, and as a result claims that the soft chancre contains no bacteria that we can recognize by our present means—neither staphylococci nor streptococci—as the exciting cause of pus formation; further, it is not an ordinary abscess, neither is it a mixed infection caused by the specific germ of the chancroid in relation with the well-known pus-forming bacteria. Inoculation, culture, and microscopical researches confirm the fact that the bubo-pus is distinct from other forms of pus and from the false membrane of the chancroid.

Colombini $\frac{57}{\text{Sept.2,9,'94}}$ sought by various means to cultivate the bacillus of chancroid not only upon artificial media, but also upon animals, and in each case without success. Peterson seems to be the only one who affirms the growth of a bacillus resembling Ducrey's bacillus, and this was not constant nor did injection of the pure culture produce a chancroid upon the animal injected; the author therefore concludes by concurring with Nicolle, that the chancroid is absolutely a human ulcer. He also thinks that the bacillus found by Unna three years afterward is identical with the one discovered by Ducrey. The difference in dimensions of the bacillus found in the pus from that found in the sore itself readily disappears when the same methods and stains are used. Colombini has also found the bacillus within the cells in both the pus and the sections. The chain formation seen in Unna's bacteria can also be seen in Ducrey's when the manipulation is sufficiently careful not to break them up. The difference in the ends, some being blunt while some are rounded, is easily explained by the relative amount of pressure against each other. When the characteristics of the two, seemingly different, are put side by side, their identity is almost certain, and for this bacillus he would propose the name "streptobacillus ulceris mollis" or "streptobacillus Ducrey." [On the whole, the question of the existence of a bacillus of chancroid must be regarded as still *sub judice*. It seems probable that the bacillus described by Unna is identical

with that of Ducrey, but that it is the specific cause of chancroid is far from proven.—J. W. W.]

Palmer [224 June 30,'94] makes the following statement in regard to the origin of chancroids: "I have never seen more typical chancroids in my life than those which begin as so-called herpes. Syphilographers of the present day are almost a unit in the opinion that chancroids do originate *de novo*, in so far as *de novo* means without sexual connection. A man may have a chancroid who has never been infected; he may have a chancroid if he has never had sexual connection. This has been demonstrated time and again, and there are abundant authorities to bear out this statement."

[Bacteriology must settle this question; but that sores clinically indistinguishable from chancroids do sometimes follow the coalescence and continued ulceration of a group of herpetic vesicles is undoubted.—J. W. W.]

Krefting [369 Jan.,'94] relates a case of buboes of both groins in which there was no genital sore, the pus from which yielded no bacteria either by culture or microscopical examination. Their origin is ascribed to the presence of numbers of pediculi pubis. The pus was, in great part, absorbed by a compression bandage. A case of chancroid simulating panaris is reported by Gaston. [14 Mar.18,'94] The sore was as large as a franc piece, with prominent edges and without induration. The bottom was covered with pus and painful, bleeding granulations. There was epitrochlear and axillary adenitis on the same side. The patient was also affected with chancroids on the prepuce and thighs, which were the source of infection of the finger.

Treatment.—The following summary is given by Arnozan [188 Feb.25,'94] of the treatment of phagedænic chancroids: The part is bathed four to six times a day, according to the gravity of the case, in water of a temperature of 40° C. (104° F.), prolonged for ten minutes. The treatment in man is usually simple, because the ulcer is mostly situated upon the penis; but in women it is more difficult. Baths of carbolic (1 per cent.) or sublimate (1 per cent.) are employed, it being remembered that the degree of heat is of greater importance than the medication. In the interval between the baths iodoform powder is employed. Dubourg [188 Feb.25,'94] insists upon exposing to view the whole of the phagedænic surface, be it a bubo or a subpreputial sore, by incisions if necessary. The

surface is cleansed with sublimate, 1 to 2000, as hot as possible, followed by thermo-cautery of the entire surface, chloroform or cocaine being used to obtund the pain. Chloride of zinc, 1 to 20, is then applied; the part is again bathed copiously with hot sublimate, dried, dusted with iodoform or salol, and covered with absorbent lint, waxed paper, and a bandage. The phagedænic ulcer soon becomes a simple one under this treatment. Constitutional treatment must also be given.

Dubreuilh [188 Feb.25,'94] follows the plan proposed by Arnozan, of hot baths (40° C.—104° F.) or 1-per-cent. sublimate solutions for women. When the chancroids are concealed by the prepuce he injects iodoform-oil. He considers iodoform the best of the topical applications, but where it is contra-indicated he employs dermatol, aristol, or salol. Lannelongue [188 Feb.25,'94] contents himself, in most cases, with iodoform, to which he adds very thin applications of Canquoin's paste or of butter of antimony which has been exposed to the air until it deliquesces. Meneau [188 Feb.25,'94] employs calomel in 10-per-cent. ointment or pyrogallic acid 25 per cent., the latter used, under strictest precautions, by the physician himself. Venot [188 Feb.25,'94] proposes cauterization of the whole surface with the thermo-cautery, caustic potash, or nitric acid, followed by finely-powdered iodoform, irrigations (either hot or cold), and hot sand-bags. Marks [65 Apr.,'94] employs a wash of chloro-phénique, pure carbolic for cauterization, and iodoform as a dusting-powder. This treatment yielded good results in a case of phagedænic ulceration of the vulva of gonorrhœal origin.

Sears [155 Jan.,'94] cleans the ulcer thoroughly, and applies iodoform, iodol, or aristol, preferring the latter, with some simple ointment. Asepsis is striven for, and dressings renewed twice or thrice daily. Eucalyptol, thymol, or sublimate gauze is employed for dressing, preferably the latter. Diet, hygiene, and constitutional treatment are valuable adjuvants to the local applications. In cases of spreading phagedæna or serpiginous ulcers he recomments hot baths (110° to 120° F.—43.3° to 48.9° C.) for hours at a time (fourteen to sixteen, if necessary). In small acute ulcers he cauterizes at once with glass rod or electric cautery, employing cocaine or a general anæsthetic. The resulting ulcer is usually healthy, and heals in a few days.

Summers [12 Mar.,'94] offers the following suggestions: Internal medi-

cation by calomel 10 grains (0.65 gramme), Dover's powder 15 grains (1 gramme), with a teaspoonful of sodium bicarbonate; iced compresses, wrung out of a solution of lead-water, laudanum, and witch-hazel, applied during the day, and at night an ointment of belladonna and Gourlard's cerate, equal parts, rubbed into the glands; gentle and continuous compression is a valuable adjuvant to the abortive treatment. If suppuration progress despite the foregoing treatment, thin strips of cantharidal plaster parallel to the chain of glands and hot poultices of flaxseed and opium; where pointing occurs, incision and insertion of drainage-tube, with continuous compression by bandage.

Jacobson $\frac{786}{\text{Nov.,'93}}$ applies pressure to the adenitis by means of bandage, sand-bags, sponge and bandage (the sponge being moistened from time to time), mercurial plaster, injection of a 2-per-cent. solution of benzoate of mercury or 0.5-per-cent. silver nitrate, and, finally, removes the glands under antiseptic precautions, or opens the abscess, washes it out with peroxide of hydrogen and 1 to 4000 bichloride solution, and drains with iodoform. Mermet $\frac{360}{\text{June,'94}}$ incises the bubo, and, if suppurating, curettes it, wipes out the tract with carbolic or zinc chloride 1 to 10, and closes the incision with sutures. Sherrill $\frac{1}{\text{Oct.28,'93}}$ cauterizes the chancroid to lessen the infection, and, if he find the glands becoming larger and more painful, resorts to the immediate removal under antiseptic precautions. He scoops out the indurated gland, packs with iodoform, and applies a dressing with pressure, changing it on the second day. He claims recovery, at the longest, in two weeks, the prevention of phagedænic infection, and lessening of disagreeable complications by this method.

Bauer $\frac{430}{\text{Nov.,'93}}$ discards the methods usually employed for the relief of chancroids, and makes applications of campho-phénique. When phagedæna is present he curettes away the gangrenous tissue and applies the same remedy.

Mikhailoff $\frac{109}{\text{Nov.,'93}}$ recommends the subbenzoate of bismuth as a substitute for iodoform in the treatment of chancroids.

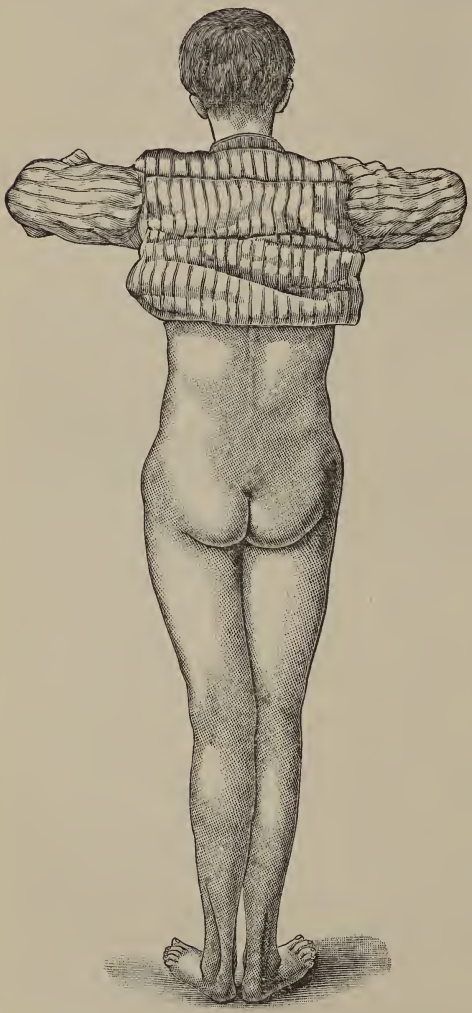
ORTHOPÆDIC SURGERY.

By LEWIS A. SAYRE, M.D.,
AND
REGINALD H. SAYRE, M.D.,
NEW YORK.

HIP-JOINT.

Deformity of Adolescence.—Royal Whitman, $\frac{1}{\text{June } 23,'94}$ of New York, calls attention to a deformity of the hip-joint that develops in adolescence under the same conditions as the other more familiar deformities of the lower extremity, most often in those who, at a period of rapid growth, of weakness and instability of the bones, are subjected to overwork or strain by occupations that require long standing or the carrying of heavy weights. During the past two years four examples of this affection have come under Whitman's observation, the history of one of them being appended: The patient was a well-nourished boy of 16 years, who for about two years had been carrying heavy weights. The previous spring he had been troubled with a peculiar soreness and stiffness about the right hip, which was considered as growing-pains. These symptoms were entirely relieved by a journey to Canada on a canal-boat. On his return his usual work was resumed, and soon after the discomfort became again apparent, and slowly increased during the winter. Recently, similar symptoms appeared on the opposite side. The symptoms complained of at this time were a feeling of fatigue and of pain referred to the right trochanter and to the front of the thigh; a peculiar stiffness about the hip after sitting or remaining long in one position. The symptoms were increased by extra work, diminished by rest; there was at no time pain when at rest. On examination, eversion and flatness of the feet were very apparent; there was slight knock-knee and slight hyperextension at the knees. The trochanters appeared slightly elevated above Nélaton's line and somewhat forward of their ordinary position. The gait was

rather rolling in character; the motion at the hip-joints was perfectly free in flexion and extension, abduction being limited to about a third of the normal, while rotation inward was limited when the feet were in the perpendicular line. The diagnosis of bending of the femoral necks was made; rest, gymnastic exercises, and tonics were advised. The advice was disregarded, however, the deformity increased, and three months later abduction of the legs was limited at the line of the body, while flexion was only possible when they were crossed. The patient was again seen at his home four months later, and a final examination was made on May 1, 1894. The abduction had increased so that the patient swung himself along on crutches, the left leg crossed over the opposite. It was only with the greatest effort that the legs could be passed by one another; so that he usually hitched along with one leg behind the other,—the so-called scissors walk.



Bending of the Neck of the Femur in Adolescence. (Whitman.)

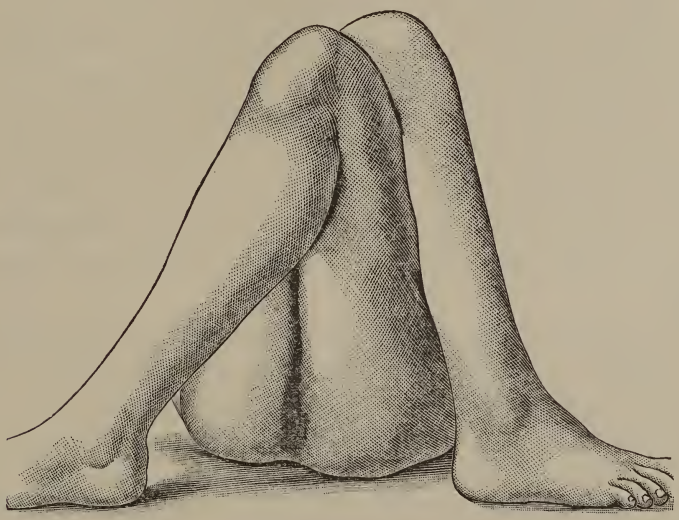
Showing the relative prominence and elevation of the trochanters, also the absence of the normal lumbar lordosis.

New York Medical Journal.

When lying on the back the eversion of the right leg was so great that the outer border of the foot rested on the table. Inward rotation was possible to forty-five degrees only. On flexing the right thigh the leg crossed that of the opposite side, and with the

thigh at a right angle with the body the outward rotation was so great that the heel was in the line of the opposite anterior superior spine. Otherwise he was in perfect health and had no pain. The bending of the necks had probably nearly reached the limit, and the author proposed to divide the femora below the trochanters so that sufficient abduction might be acquired to make walking possible. The accompanying illustrations show the condition very well.

In another case the affected limb was three-fourths of an inch longer than its fellow, as measured from the apices of the



Bending of the Neck of the Femur in Adolescence. (Whitman.)
Showing the involuntary crossing of the legs in flexing the thighs on the body.
New York Medical Journal.

trochanters to the soles of the feet; so that no actual shortening was apparent. The treatment consisted in absolute cessation of work, regular gymnastic exercises, massage, and stretching of the affected hip and knee. All the pain immediately ceased.

In another case the symptoms and appearances simulated exactly those of fracture of the neck of the femur with upward displacement. As the boy and his mother thought the symptoms —that is, the limp and discomfort on exertion—were becoming more marked, it was decided to apply a traction hip-splint to temporarily relieve the weakened bone from strain and pressure.

This, combined with massage and exercises, relieved the symptoms at once.

From the clinical symptoms it would appear that the progress of the bending of the neck of the femur is comparatively rapid until the resistance of the compressed bone is sufficient to oppose further increase of the deformity or until the head of the bone rests upon the trochanter minor, as in Hoffa's specimen. Apparently the head of the bone is usually depressed downward and backward in the line of the least resistance; the femur is thus rotated outward, which explains the eversion of the feet; the trochanter elevated and pushed nearer to the median line of the body. Its prominence is explained by the elevation and by the change in the angle of the neck. The limitation of abduction of the limb is explained by the pressure of the neck upon the upper border of the acetabulum, of the trochanter on its upper and posterior rim, and by the pressure of the lower border of the depressed head upon the lower portion of the capsule. Some authors hold that this deformity is a peculiar manifestation of rickets, but these views do not altogether meet with Whitman's approval.

As regards treatment the object should be, aside from that of the general condition: 1. To remove the exciting cause,—that is, overwork. In some cases simple cessation from work will suffice. In others the long, traction hip-splint is indicated. 2. Local massage, exercises, and manipulations and passive motion in the direction of the restricted motion,—on the principle of manipulation in the treatment of similar deformities of the knee and foot. 3. In the advanced cases osteotomy below the trochanter, on the principle followed in deformities at the knee, because the disability is caused by the adduction of the legs more than by actual shortening. By osteotomy, with consolidation, and the legs widely separated, one may, to a certain extent, replace the head of the bone in a relatively-proper position and relieve the extreme outward rotation. The diagnosis of the affection does not offer any particular difficulties at the stage in which patients usually present themselves.

Müller, of Stuttgart $^{336}_{\text{Sept.,'94}}$; Hoffmeister, of Tübingen $^{3}_{\text{Apr.25,'94}}$; and Kirmisson, of Paris, $^{853}_{\text{Sept.,'94}}$ contribute articles on this same subject. At the German Congress of Surgeons $^{2023}_{\text{'94}}$ Schede stated that he

had observed this deformity in rickety children who had never walked, and suggested that it was produced by the action of the trochanteric muscles.

Irreducible Dislocations.—M. L. Harris, of Chicago, [96 Sept.,'94] reports a case of dorsal dislocation of the hip, of four months' standing, in which unsuccessful attempts at reduction had been practiced. He operated by open incision, cleaned out the acetabulum, which was full of new connective tissue, and removed a loose piece of bone which had been detached from the posterior wall of the acetabulum; the latter seeming too small to allow reduction of the head, he enlarged it with gouge and mallet. The head of the bone then entered the acetabulum with difficulty. The wound was partly stitched and partly packed. In three months the patient could walk without a cane and without pain, free motion in all directions becoming greater daily. The author has collected twenty-six cases of old, irreducible dislocations of the hip in which operations of one sort or another have been performed. The conclusions at which he has arrived are as follow: (1) that, owing to the danger of fracturing the neck of the femur, lacerating the great vessels of the thigh, producing shock and death, the application of great force to reduce old dislocations of the hip should be discontinued in favor of arthrotomy; (2) that subcutaneous operations in old dislocations are without benefit; (3) that osteotomy below the trochanter could scarcely come into consideration at this day; (4) that resection is only to be thought of when reduction by arthrotomy fails; and finally (5) that the operation which has given the best results is free arthrotomy, with reduction after the method described.

Hartmann, of Paris, [853 May 1,'94] gives the history of a case of spontaneous dislocation of the hip, occurring in a girl 18 years old, during an acute arthritis of the hip-joint. After the dislocation had lasted one month it was reduced by manipulation under anæsthesia by Bigelow's method, and kept in place by a side-splint and extension. In a month's time the dressings were removed and massage given, and in two months the patient left the hospital, walking without a cane.

Congenital Dislocation.—E. H. Bradford, of Boston, [96 Aug.,'94] reviews the subject of congenital dislocation of the hip, presenting a specimen of double dislocation in which he had operated, after

Hoffa's method, on one side, the child dying a month after the operation from diphtheria and septicæmia. At the operation it was not possible, after freeing the femur from the attachment of all the pelvic muscles, to bring the trochanter below Nélaton's line. It was consequently impossible to pull the femur into its normal position. An acetabulum was made where the acetabulum should have been, as far as could be determined by the touch. Reduction was possible by manipulation,—*i.e.*, flexion and rotation,—but dislocation occurred when efforts were made to straighten the femur from the flexed position it took if the head were put into the acetabulum. The specimen showed that the obstacle was clearly the anterior and strongest fibres of the capsular ligament. On the side not operated upon it was impossible to reduce the dislocation by any method, either by traction or manipulation. The specimen also showed that although the curette was used at a point which at operation appeared to be the proper position, yet it did not enlarge the normal acetabulum, but was at a considerable distance above.

It would also appear that Kirmisson is correct in claiming that facts do not support Hoffa's belief that the portion of the ilium in congenital dislocation that it is desirable to curette for the deepened acetabulum is the thickest portion of the ilium. This was not found to be the case in any of the four specimens at the Warren Museum in Boston. It has occurred also to the writer that, in all probability, if an anterior division of the strong ilio-femoral capsular bands were to be made freely, older cases would be operated upon with better success than those of the age recommended by Hoffa; for no direct obstacle exists to reduction, even in adolescent cases, except the contraction of the soft parts. The incision which seems to him most suitable may be briefly described as a primary side-incision along the trochanter (in front of the line of the Langenbeck incision) and a secondary deeper cross-cut on the anterior surface of the capsule near the intertrochanteric line of the femur. Instead of this incision, the Lorenz incision—*i.e.*, an anterior incision directly over the neck and exposing at once the anterior face of the capsule—naturally suggests itself. This has its advantages, but the attachments of the muscles to the greater trochanter are not so readily freed as by the side-incision, and drainage is not so well provided for, which, in a deep wound, is of importance.

Vallette, $^{55}_{\text{Aug.25,'94}}$ in a paper on the anatomical pathology and operative treatment of congenital dislocation of the hip, presented to the Paris Academy of Medicine a very extensive bibliography of the subject.

Hoffa, of Würtzburg, $^{336}_{\text{July 28,'94}}$ at the Twenty-third Congress of the German Surgical Society, presented a specimen of a case in which he had done his operation for congenital dislocation. The child was 3 years old and had died of diphtheria six months after operation. There was an excellent artificial joint. The articular surfaces were covered by hyaline cartilage, as shown by microscopical examination, and motion in the joint was correspondingly smooth. The cotyloid cavity was deep and gave firm support for the head of the femur. He drew attention to the fact that the round ligament is usually absent in cases of double congenital dislocation (he having found it but four times in forty-four cases), but that it is frequently present in unilateral cases. He still thinks the favorable age for operation is from 3 to 6 years. Old cases should be left alone; if, however, the head of the femur keep slipping higher and higher up on the dorsum of the ilium he advises shaving a slice off the head of the femur, thus removing the round ligament, scraping off the periosteum from the point where it comes in contact with the ilium, and allowing these two raw, bony surfaces to come in contact and make firm union, which he thinks preferable to König's method of turning up a piece of bone with periosteum attached from the posterior superior part of the joint in order to make a shoulder for the femur to rest against. In the discussion that followed, Schede, of Hamburg, thought that the forward curving of the neck of the femur was independent of the age of the case, he having found it in children 3 and 5 years old, where he had been obliged to do a subtrochanteric osteotomy later on, after the reduction of the dislocation, in order to bring the toes to the front. He recognized the difficulty of operating in older cases, but had operated successfully on a young man of 20 years, reducing the dislocation by means of strong traction after section of the muscles, this being done as a preparatory step. He had had good results also in a woman of 32 years, suffering from a traumatic dislocation.

Kirmisson $^{853}_{\text{Mar.1,'94}}$ has done subtrochanteric osteotomy in congenital dislocation of the femur where there was bad limping due to

marked flexion and adduction of the thigh. He reports marked improvement in appearance and function in four cases on which he operated.

Paci [853 Sept.1,'94] presented a paper, at the International Medical Congress in Rome, on his method of reducing congenital dislocation of the hips by manipulation. He gives extracts from letters from ten medical men who have also used his method with success.

Hip Disease.—Bruns, of Tübingen, [336 July 28,'94] gives the results of the conservative treatment of tubercular hip-joint disease at the Tübingen Clinic in the past forty years. By excluding cases of *coxa vara* (or bending of the neck of the femur), disease secondary to acute infectious osteomyelitis, cases that lasted less than two years, and those that made perfect or nearly perfect recoveries, the number was reduced from 600 to 390, which were tabulated. Of these, 321 were treated conservatively and 69 by resection. His researches led to the demonstration of the following facts: 1. That tubercular coxitis is almost confined to those younger than 20 years, 48 per cent. of the cases being below 10 years, 37 per cent. between 10 and 20, and only 6 per cent. over 20. 2. That one-third of the cases recovered without suppuration. 3. That 55 per cent. were cured by conservative treatment, the average time being four and a half years. 4. That 40 per cent. died ordinarily from tuberculosis of other organs, chiefly lungs and meninges, usually after three years' duration of the disease. 5. In each case the prognosis depended chiefly on the presence or absence of suppuration, 77 per cent. of cures coming from the non-suppurative class and only 42 per cent. from the other. 6. As for prognosis, the age at the time of the commencement of the disease is important, the prognosis growing worse as age advances, no cases being cured that were attacked after the fortieth year. In the suppurative cases especially the chances of recovery are very small after 20 years. 7. The majority of people affected with tubercular coxitis ultimately die of tuberculosis of other organs. Thus, 6 per cent. of children cured below 10 years died later of pulmonary phthisis; this proportion rose to 9 per cent. between the ages of 11 and 20, and 7 per cent. of those over 20 years.

Of the cured cases the majority had good health and a satisfactory functional use of the affected limb. They all showed some

atrophy, shortening, and more or less complete ankylosis of the joint, with a certain amount of limp; but, nevertheless, they could usually walk long distances without fatigue. Of course, these results must necessarily follow the exclusion of all good recoveries from the list of cases, which was presumably done to eliminate the chances of mistakes in diagnosis.

Bruns thinks that shortening is primarily a result of arrest of development rather than of absorption of bone, and he points to the diminished size of the leg and foot as proof of this. He also draws attention to the fact that flexion and adduction are much greater hindrances to good locomotion than real shortening. The mean shortening in this series of cases was seven centimetres, the greatest twelve centimetres. These cases, extending over a period of so many years, were treated by various modes: at first, revulsives, blisters, and cautery; later on, immobilization by apparatus and extension by weights; and, last, iodoform. Many left the hospital before they were cured and the treatment was imperfectly carried on at home. In contrasting these cases with those where early resection was done, Bruns does not find any advantage in the latter method, either from a functional point of view or by reason of diminished mortality, and reserves it for a life-saving measure.

In this view, Schede, of Hamburg; Helferich, of Greifswald; Gussenbauer, of Prague; von Bergman, of Berlin; and von Bramann, of Halle, coincided; and judging from the fact that these statistics are deduced from what would now be considered very poor conservative treatment, proper protection of the joint should give an infinitely larger proportion of cures than immediate resection.

H. L. Taylor, of New York, $\frac{117}{\text{Nov.,'93}}$ describes an improved, long, traction hip-splint, which consists in a hollow shank firmly secured at its upper end to a side-plate, from which strong, curved, steel horns spring to carry the perineal strap. In this shank plays a notched bar, which is worked by a key; this bar is bent under the foot at a right angle and flattened to give attachment to a strap, which is buckled to the adhesive plasters ending just above the malleoli. The improvement in the apparatus described over the original Taylor hip-splint consists mainly in the substitution of the rigid, curved, steel horns of peculiar shape for the horizontal hip-band.

De Forrest Willard, of Philadelphia, [19 Mar.24,'94] calls attention to the possibility of mistaking sarcomatous and other tumors for hip disease. The chief points of difference are that as the growth proceeds it is apt to become more localized,—that is, its projection is a firm, hardened mass in a certain direction, usually anteriorly; while in the tubercular variety the thickening is more diffused over the region of the joint. The tumor may or may not be nodulated. Restriction of motion is positive in one direction, usually extension; while flexion is somewhat interfered with by the size of the growth. Tenderness is also limited to a small area,—smaller than in the tubercular variety; pain but seldom extends down the inside of the thigh toward the knee. Flexion is usually present to a moderate degree. Abduction and adduction are rarely present. The buttock may be flattened and the ilio-femoral crease shortened, as in tubercular hip disease. Instead of atrophy of the limb there is usually swelling or œdema.

A. B. Judson, of New York, [1 Dec.2,'93] gives an interesting collection of historical notes on the question of the value of traction in the treatment of hip disease, from the time of Sir Benjamin Brodie, in 1834, to the present day. E. H. Bradford and Robert Lovett, of Boston, [1 Aug.4,'94] present a series of experiments on the cadaver and living subject to demonstrate the possibility of separating the articular surfaces of the femur and innominate bone by an amount of traction capable of being endured by the patient. This condition they call "distraction" and claim that it is possible to accomplish it practically, and that, theoretically, it is an object to be sought for. The histories of a number of cases of severe, moderate, and slight grades of the disease are detailed, showing the efficiency of treatment by constant and continuous traction.

In conclusion, it is claimed that, at a certain stage in hip disease, traction force is desirable, and that the amount of traction should be in proportion to the amount of muscular spasm and continued as long as the spasm persists. It is also clear and demonstrable that an efficient traction force distracts, and it is manifest that distraction, or the separation of one inflamed bone from an adjacent inflamed bony surface, is desirable; that in this way every chance is given to promote cure and cicatrization of the previously-inflamed bone. If an indication for surgical treat-

ment is ever clearly written in pathological specimens, certainly that of distraction should never be overlooked. It should always be remembered that, in treating hip disease at a certain stage, the object should not be simply rest, or fixation, or protection from jar, but actual distraction, and that traction short of this is inefficient.

SPINE.

Pott's Disease.—Ménard, of Berck-sur-Mer, [853 Jan.,'94] advocates the direct opening of tubercular foci in the spine in cases of paraplegia in preference to laminectomy. His plan is as follows: A vertical incision, six centimetres long and three centimetres to the right, at the point of greatest deformity, is made, dividing the skin and muscles. One or two transverse spinal processes are resected with a gouge-nippers, and, subperiosteally, the last five or six centimetres of the corresponding ribs. The periosteal canal of the removed ribs is followed with a curved director, the tubercular focus in the vertebral bodies entered, the tubercular matter cleaned out, and a double drain inserted and the cavity washed out with an antiseptic solution. The wound is sewed up except where the drain passes. He reports three successful cases.

Walters, of Reading, Eng., [6 July 14,'94] has made a modified Volkmann spoon for scraping out tubercular spots in the spine, much resembling Sims's steel curette in form. The scoop has a long, thin shank, which is bent at an angle of forty-five degrees with the handle, and has a cutting-edge directed either toward or away from the angle; so that the operator can work around a corner and gain access to all parts of a cavity.

Roberts, of Philadelphia, [19 Feb.24,'94] reports a case of laminectomy in a child, 10 years old, who had become paraplegic, after a fall down two steps, three months previously. Paralysis of motion and sensation with bed-sores existed. There was swelling in the dorsal region on each side of the spine, especially the right. An incision into the swelling on the right gave vent to some cheezy matter, some small fragments of bone, and a considerable quantity of fluid blood. The bleeding seemed to be venous and was quite profuse, the patient dying on the table from hæmorrhage and shock. Two laminæ were removed, so soft that they were cut with the scalpel. A vein had been opened by the progress of the disease and caused an hæmatoma, which had pressed on the cord. In the discussion

on the case Willard said he thought that shock from interfering with the cord had as much to do with the death as the hæmorrhage. It was his experience that manipulating the spinal cord always gave rise to most profound shock.

Schaeffer, of Chicago, $^{451}_{\text{July,'94}}$ also reports a case where there was profound shock after laminectomy, although the bleeding was not excessive. In this case there was complete paralysis. On operation it was found that the bodies of the fourth and fifth dorsal vertebræ were completely destroyed, and the probe passed into the chest, touching the pericardium, as denoted by the pulsation. In twenty-four hours sensation began to return; four weeks later there was perfect sensation and the patient was gradually gaining strength. Porritt, of Leeds, Eng., $^{2}_{\text{Nov.18,'93}}$ reported, before the Leeds and West Riding Medico-Chirurgical Society, a case of intra-spinal abscess following injury, where, a fortnight after the injury, the patient's temperature fell to 90° F. (32.2° C.), the pulse dropped to 31, and the respirations to 7½ per minute.

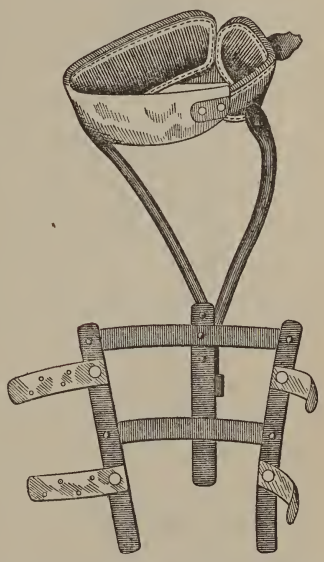
Sloan, of Seattle, $^{59}_{\text{Mar.10,'94}}$ describes a mode of applying plaster-of-Paris jackets in the horizontal position. The patient is placed in a hammock face upward, instead of prone, as in Davy's method. The hammock is cut off on the sides so as to include only one-half of the patient's body. An horizontal bar is suspended at convenient height above the patient, to which is attached the end of a gauze bandage. Three or four turns of the bandage are taken around the patient's body and up over the bar, leaving, between each turn around the body, a space of two inches. This procedure not only supports the weight of the body and holds it in its natural position, but it causes the hammock, with the dressing to be applied over it, to fit the concavity of the back snugly.

Sherman, of San Francisco, $^{77}_{\text{Dec.,'93}}$ has modified the Sayre jury-mast by fastening to the back two aluminium bars, which terminate in a padded chin-collar. See illustration.

A. M. Phelps, of New York, $^{1}_{\text{Oct.14,'93}}$ uses, in convalescent cases of Pott's disease and in lateral curvature, a corset of pure aluminium, made by hammering the metal on an iron cast from a plaster-of-Paris jacket made in the usual way. The corset opens in the back by means of hinges, and hooks in front. It allows of bathing with the jacket on; it is light, but expensive.

Spondylitis Deformans.—Stocker, of Forest Gate, Eng., $^{1077}_{\text{May 9,'94}}$

describes a patient who was an excellent example of this remarkable condition. His back was bowed and head bent forward, so that he was always looking to the ground. So far as could be ascertained, his whole spinal column was one piece of bone; he could neither nod nor move his head from side to side. His right scapula appeared to be quite fixed, and the left was almost so. Although his shoulder-joints were free from disease, the fixation of his scapulæ made the movements of his upper extremities very restricted. All the ribs were ankylosed and respiration was wholly abdominal. No stiffness or rheumatoid changes could be discovered in any of the joints of the limbs. The patient, who was a healthy-looking man of 37, denied having ever had gonorrhœa, thus excluding the suggestion of gonorrhœal rheumatism. His illness had begun about four years ago. He never had rheumatic fever. He had, however, had two attacks in his foot not unlike gout; his father had suffered from gout in the great toe more than once, and several relatives were believed to be subject to rheumatic gout. Spondylitis deformans is, in the writer's experience, almost always a consequence of gonorrhœal rheumatism, and the latter is, in its turn, an appanage of inherited gout.



ALUMINIUM CHIN-COLLAR AND FORK. (SHERMAN.)
Pacific Medical Journal.

S. Weir Mitchell, of Philadelphia, [9 Dec.9,'93] reports three cases of curious deformity of the spine associated with a diseased mental condition. The posture of one case is shown in the figure on next page.

Her general bearing is striking. The abdomen is thrown forward; the shoulders back, the right one being much higher than the left; while the head is thrown forward, the chin at times resting upon the chest. The left thumb is strongly flexed, the forearm pronated, and the arm rotated inwardly. The entire spine bends stiffly, and it appears impossible for her to stand erect. There is no evidence of spinal bone disease, no angular curvature,

no pain on pressure, nor sensitiveness to heat or to cold. While there is quite a little general muscular weakness, there is no true palsy, and, except for slight pallor, she is well nourished. There are occasional slow, lateral movements of the head, and the hands are slowly passed over each other. Whether these movements are purposive or automatic cannot be determined. The fingers of both hands can be passively hyperextended. Her expression is fatuous and idiotic. She seems to take no notice of her surroundings, and is absolutely without interest in anything. Her replies to questions are silly, her speech slow and somewhat thick. She sleeps well now, but formerly badly, and seemed to fear the dark. Menstruation has never appeared, though she is quite well developed. Her appetite is fair. The urine is normal. The knee-jerk is slightly large, but not spastic. Sensation is normal. De Schweinitz examined her eyes, finding concomitant convergent squint, no swelling of disc, but a diffuse retinal haze, especially marked above and below the discs. Both eyes are hypermetropic.

Spinal Anterior Curvature, with Mental Aberration. (Mitchell.)

Medical News.

Besides the three cases presented at this time, Mitchell has seen three others, quite similar, at various times in consultation, and propounds the following question: Is there a clinical type, hysterical or not, characterized by mental failure, physical weakness, retinal changes (?), and rapidly-evolved spinal curvature, extreme in degree and otherwise unusual in type, not due to organic vertebral disease?

Abnormal Attitudes of the Vertebral Column Caused by Lipomata.—Two such cases are reported by Gérard-Marchant.[853 Jan.,'94] In the first case the lipoma was situated on the dorsum of the ilium and partly adherent to the gluteus maximus; it caused great pain when standing and limping, as well as marked lateral curvature of the spine, all of which symptoms disappeared after its removal. The second patient was bowed forward like an old

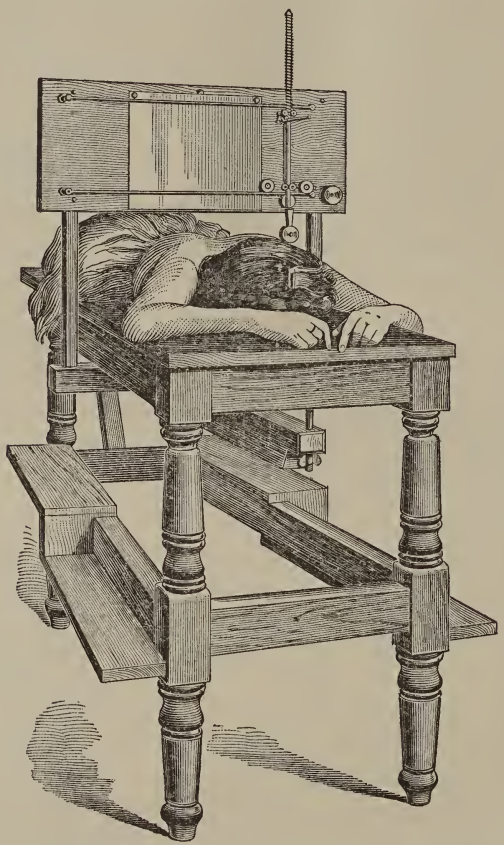
man and suffered pain either when standing or lying. This condition had come on after a fall three years before, and no treatment had relieved him. It was impossible for him to pick up any object from the ground, and even movements of the arms caused pain. An examination showed a small almond-shaped growth near the extremity of the left transverse process of the third lumbar vertebra, which on removal proved to be a fibro-lipoma traversed by many nerve-fibres. The day after its removal the man could move his trunk and walk as well as ever.

Scoliosis.—Casse, of Liége, $\frac{52}{\text{v.8,No.1,'94}}$ reports a case of scoliosis in a child of 5 years, who had evidences of rickets and in whom the rotation of the spine and curving of the right ribs were becoming more marked. Having noticed bulging of the ribs on the side opposite to that on which Estlander's operation had been done, it occurred to him to remove part of the bulging ribs in hopes of rendering the chest symmetrical by a reversal of the process. This he did on November 16, 1893, resecting, subperiosteally, $2\frac{1}{2}$ centimetres of the fifth, 3 of the sixth, $2\frac{1}{2}$ of the seventh, and 2 of the eighth ribs. Fearing the cut ends might wound the pleura they were sewed together. The child made an uneventful recovery.

Mauclaire $\frac{7}{\text{No.7,'94}}$ describes a specimen of marked lateral curvature in which there was an exostosis in front of the right acetabulum, and the neck of the right femur made an angle of 95 degrees with the shaft, instead of 129 degrees, being thus markedly lowered, and at the same time was turned very far backward, making an angle of 110 degrees, instead of 30 degrees, with the transverse plane of the shaft. On section, a small, rounded cavity was found, with a cheesy centre. Bacteriological examination failed to reveal the presence of tubercular bacilli and the synovial membrane seemed normal. The writer was disposed to consider it a case of malnutrition of bone and bending due to rickets.

Raymond Sainton, of Paris, $\frac{853}{\text{July 1,'94}}$ records three cases of scoliosis dependent on infantile paralysis, in which he endeavored, without success, to determine the influence of the paralysis on the position of the curve. He noticed, however, that one boy, of 6 years, who had had a straight spine before his attack of infantile paralysis, seven months before, had, at the time of examination, quite marked bony deformity, showing that, under the influence of improperly-supported weight, the skeleton rapidly changed its shape.

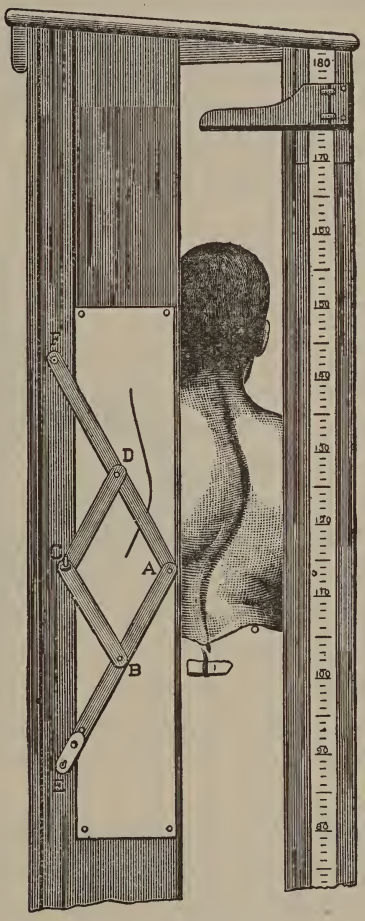
L. A. Weigel, of Rochester, $\frac{814}{\text{Nov.,'93}}$ presents an apparatus designed to afford a ready and accurate means for recording rotation. It is mounted on a thin board of convenient size, which is to be placed, in any convenient way, vertically over the patient, who should be in the recumbent posture. The apparatus consists of two parallel rods upon which a trolley moves horizontally,



Apparatus for Recording the Curve of Rotation in Scoliosis. (Weigel.)
American Medico-Surgical Bulletin.

guided below on a rod by three grooved rollers and above by a fork which clasps the rod. To the trolley is attached a pencil which is held against the paper by a light spring, and is readily drawn away from contact with the paper when the machine is being brought into position for starting. The vertical rod ends below in a fork which carries a roller. This roller is so con-

structed that it may revolve upon its own axis and also swing around the pins as a centre. The movement of the rod is guided by the rollers. The movement of the whole mechanism across the board is controlled by a drum containing a coiled spring which winds up as the tracing is made. This, together with the helical spring which controls the vertical action of the rod, makes the action of the apparatus almost automatic, it being necessary only to guide the roller across the patient's back. The marking pencil thus takes the horizontal movement of the trolley and the vertical movement of the perpendicular rod as it moves across the patient's body, and records the curve of the back on the piece of paper secured to the vertical board fastened to the table by wooden legs.

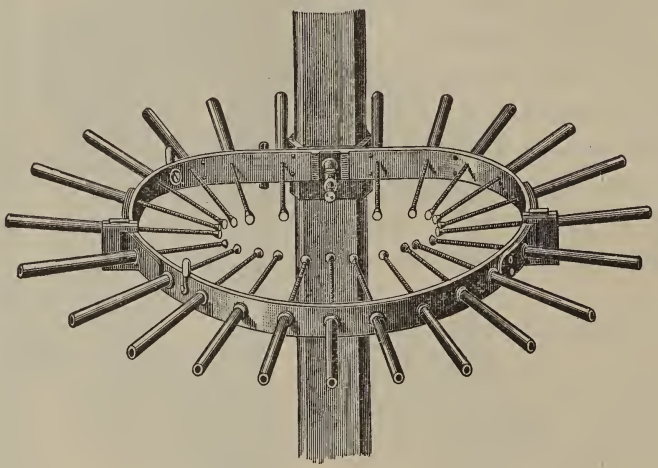


Apparatus for Recording Scoliosis. (Sainton.)
Revue d'Orthopédie.

Raymond Sainton, $\frac{853}{\text{Mar. 1, '94}}$ of Paris, gives an account of the various forms of apparatus used for recording scoliosis and describes in detail those used by Kirmisson. The latter objects to those that record the shape of the body while recumbent and uses those employed with the patient standing erect. By means of a pantograph, consisting of a parallelogram with a pencil in one angle which records on a piece of paper the movements made by an ivory button at the corresponding point of the machine, he traces the lateral deviation of the spine, and by means of a second apparatus he records the contour of the entire thorax. The latter consists of two semicircles of steel opening on a hinge and sup-

plied with numerous metal fingers, which project toward the centre of the circle and are pushed toward this point by springs, thus pressing against the body of the patient, who is placed inside the circle. A clamp then locks the pins in position, the semicircles are opened, and, after the patient has stepped out, are closed again and placed on a piece of paper on a board and the outline of the chest transferred to it by means of pressure on the points of the metal fingers. (See illustrations.)

Spina Bifida.—At the Eleventh International Medical Congress Mayo Robson $\frac{6}{\text{Apr.1s,'94}}$ reported twenty cases of spina bifida on which he had operated, with sixteen successful results. He did



APPARATUS FOR RECORDING SCOLIOSIS. (SAINTON.)
Revue d'Orthopédie.

not deem it advisable to operate in cases where there was well-marked paraplegia or hydrocephalus, nor in patients suffering from marasmus; neither would he recommend operation in cases where the tumor was small and well covered by a firm pad of integuments. Stone, of Lincoln, Neb., $\frac{106}{\text{Jan.29,'94}}$ reports a case of lumbar spina bifida successfully treated by excision of the sac and suturing the integument after injections of iodoglycerin solution had failed. Herrick, of Troy, N. Y., $\frac{1}{\text{Dec.30,'93}}$ reports a similar cure of a lumbar spina bifida by incision, dissection of the nerve-fibres from the cyst-wall, their replacement within the spinal canal, and removal of superabundant sac, with suture of the integument.

Bobroff, of Moscow, [2 June 16,'94] proposes the following method: When the meningocele is situated in the sacral or lower spinal region the sac is opened, the adherent spinal cord separated and replaced in the canal, or, if the tail is present and inseparable from the sac, it is divided, the superfluous part of the sac cut away, and the gap filled up by separating a thin piece of bone from the posterior superior spine of the ilium and the adjoining part of the crest, preserving its connection with a part of muscles attached to them, and placing this flap in the cleft and sewing up the wound. Sklifassofski presented a report on this procedure to the last Russian Medical Congress. [586 No.8,'94] Of four cases operated upon by different surgeons, healing by first intention was obtained only in one, although all of them were carried out antiseptically, but in none of them did the transplanted bone necrose. As to the results of the operation, Sklifassofski's patient had suffered from perforating ulcer of the foot, anæsthesia, and incontinence of fæces. After the operation the ulcer healed and the other symptoms improved considerably. From the discussion, however, it appeared that Sklifassofski himself was as yet doubtful as to what would become of the transplanted bone, and he did not exclude the possibility of its absorption. In cases of spina bifida in the middle and upper regions of the spine, Bobroff suggests that some part of a rib, with adherent soft parts, should be used as a flap, and Sklifassofski recommends that part of the scapula should be taken for the same purpose. Neither of these procedures has yet been carried out on the living subject. Knox [6 Feb.24,'94] reports a case of spina bifida with ulceration and rupture of the sac, followed by spontaneous cure.

John B. Roberts, of Philadelphia, [19 Jan.6,'94] is in favor of excision in preference to injection of Morton's solution, in opposition to the report of the Committee of the Clinical Society of London, and reports a fatal case of his own in support of his position, the death being due not to the operation itself, but to suppuration in consequence of defective technique.

FOOT.

Club-Foot.—J. K. Young, of Philadelphia, [9 Apr.21,'94] mentions a case of spontaneous recovery from double congenital equino-varus, which was reported to him by J. Wellington Byers, of Charlotte,

N. C. The patient is a negro 36 years of age. At birth the toes of both feet touched the heels. The child walked first at 5 years, and wore its first pair of shoes—heavy, thick ones—at 13 years of age. He walked on the sides of his feet, the toes being still in the same position as at birth. Up to the age of 20 years he continued to stand and walk on the sides of his feet, lifting one foot over the opposite. At the age of 26 years spontaneous improvement was noticed in the right foot, which has gradually progressed until now, when the entire foot and leg are normal in size, shape, position, and function. The left foot is still slightly turned in,—pigeon-toed,—though the man stands flat on the foot, the only abnormal features being a small leg and slight contracture of the extensor tendons on the dorsum. Improvement is yet constantly going on, and a complete cure appears to be only a question of time. A somewhat similar unilateral case is recorded by Dupuytren in his lectures on clinical surgery.

T. Halsted Myers, of New York, [814 June 15,'94] suggests the complete or partial evacuation of the astragalus by means of a sharp spoon as a substitute for its excision in inveterate club-foot. An Esmarch bandage is applied. A half-inch incision is made over the prominent part of the astragalus, the knife being carried through the periosteum. A small, sharp spoon is now introduced by a boring motion into the bone, and all or any part of its cancellous tissues can be readily removed. The joints should not and need not be opened at all if care is used. The foot is forced by the hand into the position desired, the deformed articular surfaces of the astragalus being thus brought into normal relations with the articular surfaces of the tibia, fibula, scaphoid, and os calcis. If rotation on the vertical axis is still not completely overcome, a wedge can be curetted in the same way through a separate external incision from the neck of the os calcis or from the cuboid. A retention dressing is now applied with the foot in a slightly hypercorrected position, and the usual after-treatment employed. He has operated on two cases, with good results and good motion at the ankle-joint.

Gardner, of Melbourne, Australia, [285 Sept.15,'94] has modified Phelps's operation by inserting a wedge-shaped plate of decalcified bone into the gap left between the astragalus and scaphoid, to which bones it is wired, which keeps up the lengthening of the inner side until the plate is replaced by fibrous tissue. There is thus a minimum

of interference with the tarsal articulations and the arch of the foot is not destroyed. The foot must not be used in walking until the wound is soundly cicatrized.

Moore, of Melbourne, $^{285}_{\text{Apr.15,'94}}$ writes strongly in favor of Fitzgerald's operation of subcutaneous osteotomy of the tarsus, and his testimony was borne out by that of many other speakers at the meeting at which his paper was read.

Davy, of London, $^{6}_{\text{Oct.14,'93}}$ advocates, in the treatment of equinus, in preference to tenotomy of the tendo Achillis, severing the spur of the os calcis, with the tendo Achillis attached to it, from the anterior and major segment of the os calcis; then, by slicing off to the right or left of the major segment and by affixing the spur to this freshened right or left osseous bed, the tendon is made to act upon the foot, either to the right or the left, by adjustment and fixation. Surgically, the inner adjustment would favor and promote varus and the outer adjustment would favor valgus. The lateral new position becomes a factor in treatment, the valgus union of bone being planned for varus and the varus union of bone for valgus. For internal rotation of the leg after club-foot he uses an elastic strap, passing around the limb in a spiral, going from the little toe upward behind the calf and across the front of the thigh, to be attached to a pelvic belt.

H. Augustus Wilson, of Philadelphia, $^{814}_{\text{Feb.1,'94}}$ gives an analysis of 435 bone operations for club-foot by 108 operators. There were 3 deaths from septicæmia, 3 from diarrhœa, and 1 from carbolic-acid poisoning. Suppuration took place in 15 cases, and gangrene, necessitating amputation, in 1 case. Of the results, the feet were not entirely corrected in 9 cases; unsatisfactory, 9; tendency to recur, 17; some subsequent operative procedure was required in 5, making 40 cases which the operator records as not being benefited. Amputation was done in 2 cases for pain. With comparatively few exceptions, braces or some form of apparatus or support were required in nearly all of the cases. The various reasons given for their use may be classified under the condition of muscular atrophy from disuse. In a great many of the cases it appeared that nothing had been gained except the appearance of correction, inasmuch as an apparatus, very nearly identical with that ordinarily employed, was required just as much after as before, and there was not a restoration of the mechanical functions.

He adds a number of letters which give all varieties of opinions, from those absolutely condemning all bone operations—as for instance, Lorenz, of Vienna—to those saying it is essential in bad cases to remove more or less bone. In this connection may be mentioned a case by Wolff, of Berlin, $^{69}_{\text{July 26,'94}}$ who showed a very extreme case of double congenital equino-varus, in a man, 31 years old, never treated. In five weeks Wolff had brought his feet into very good position by renewed applications of plaster-of-Paris bandages, applied while the foot was held in as good a position as possible by numerous assistants. He allowed the patient to walk home. After six months the plaster boots were removed and new ones applied to correct any defects that might have been left,—all this without narcosis and practically without pain.

Hartley, of New York, $^{96}_{\text{Mar.,'94}}$ gives the results of 25 cases of club-foot treated by operation at the Roosevelt Hospital from 1886 to 1893. Sixteen other cases were treated, but as no personal information could be had as to the results they were not included in the report. There were 15 cases of congenital equino-varus operated on by more or less extensive bone removals from 26 feet, with perfect results in 9 feet, good results in 14 feet, satisfactory results in 1 foot, and imperfect in 2 feet. One case of congenital equino-valgus in which there was arthrodesis of the ankle-joint was treated by removal of a wedge from the articular surface of the astragalus and tibia, with cuneiform of part of astragalus and scaphoid bones, with good result. Nine cases of paralytic talipes equino-varus, with 9 feet operated on, gave 6 good feet, 2 satisfactory, and 1 imperfect.

Redard $^{55}_{\text{Jan.13,'94}}$ describes an apparatus for the after-treatment of equino-varus, consisting of a foot-piece hinged to a board, which has leg- and ankle- supports to hold the leg firmly fixed. Elastics run from the foot-board to the side to evert the foot and, also, to the leg-board near the knee to bring the foot to a right angle. These elastics can be varied in strength according to the requirements of the case, and serve to give a species of massage and gymnastic exercise to those cases where it is not practicable to have the child's feet regularly and systematically manipulated by a nurse.

Flat-Foot.—Kennedy, of Glasgow, $^{213}_{\text{Sept.,'94}}$ reports an autopsy made on a case of adult flat-foot. Amongst other peculiarities he

notes the following: The tip of the external malleolus was situated considerably in front of its usual position, and was so much depressed that it actually rested on the os calcis; this result was caused chiefly by the altered position of the astragalus, but also partly by the rotation inward of the os calcis on its long axis. The result of this contact was made evident by the formation of a joint between the tip of the malleolus and the os calcis. On the latter, at the point of contact, a well-marked concavity existed, and the two contiguous surfaces were covered by articular cartilage. This abnormal joint was pointed out by John Wood in 1859, and has been found and described since by Hueter, von Meyer, Symington, and Chaput. A frequent site of pain in cases of flat-foot is just below the external malleolus, and this is readily accounted for by the abnormal contact between the malleolus and the os calcis and the crushing of the tissues which must thereby result before the complete joint is established. The position of the internal malleolus was also altered, being at a much lower level than in the normal foot. The position of the astragalus is of particular interest, as this bone is probably the first to alter its position. Its head was turned inward and depressed, and formed, therefore, the well-marked prominence in front and below the internal malleolus. This prominence is always well marked in all advanced cases of flat-foot. By the rotation inward of the head of the astragalus the relation of that bone to the articular surface of the scaphoid is greatly altered. Viewed from the inside of the foot, the greater part of the articular surface of the head was visible, not in contact with bone, but gliding on the ligamentous structures, which were removed in the dissection. The articular cartilage of this part of the head was eroded at several points,—a condition which has been noted by others and thought to be due to the pressure against the ground. The ridge, which in the normal astragalus separates off the small part of the articular surface which glides on the ligament, was obliterated, the head being uniformly rounded. Only a small portion of the outer part of the head was in contact with the scaphoid. The two tarsal ligaments which were most distinctly elongated were the external calcaneo-astragaloid and the calcaneo-astragaloid interosseous. Judging from this dissection, these are the ligaments which are chiefly concerned in the production of the deformity.

G. E. Shoemaker, of Philadelphia, [9 Mar.17,'94] describes a case of congenital hypertrophy of the foot in a girl of 19, who had also hystero-epilepsy, dysmenorrhœa, and internal strabismus of one eye. The left calf was three-fourths of an inch larger than the right and the left foot about one inch longer than the right and three times as thick. The hypertrophy began just below the outer malleolus and involved bone, muscle, and skin. The outer three-fifths of the foot were affected, following the rule that in hypertrophy of the hand the little-finger side is usually involved, as pointed out by Charcot. Amputation of the two outer toes was performed with good result, convalescence being slow on account of the poor nutrition of the affected parts, which caused part of the flap to slough with a kind of dry gangrene.

Hallux Rigidus.—Mayo Collier, of London, [6 June 30,'94] defines hallux rigidus as a stiff and painful condition of the metatarso-phalangeal joint of the great toe, usually consequent on and associated with flat-foot, and, like flat-foot, not necessarily confined to one foot, but more often sooner or later affecting the same joint of the opposite foot. The victims of this disorder are usually young persons at or about puberty. He has diagnosticated, treated, and subsequently operated on 9 cases,—2 females and 7 males,—and in all but 2 the subjects were young adults between 16 and 20 years of age. In all, the disease was associated with flat-foot, cold feet, and impaired nutrition. After a preliminary trial of tonics, frictions, and appropriate boots, all were operated on, and the head of the metatarsal bone was removed. The joints healed in all cases by first intention, and movable and useful joints resulted. T. S. Ellis, of Glouster, [6 July 7,'94] in commenting on this article, draws attention to the necessity of preventing improper relation of the toes to each other inside the boots by having proper-shaped stockings as well as proper shoes. A pointed-toed stocking will prevent the toes from lying flat even if the shoe be properly shaped, and this crowding of the toes out of position is the cause of the erosion of the cartilages from undue pressure in a bad position.

Hallux Valgus.—Goldthwaite, of Boston, [99 Nov.30,'93] describes two new splints for the correction of mild cases of hallux valgus, as shown in the illustrations. Both can be worn inside an ordinary shoe, and at the same time exert pressure enough to hold the

toe in the correct position. This pressure can be increased from time to time, if it seem necessary, by simply rebending the splint. The appliance is so fitted that no weight comes upon it in walking, the ball of the toe and ball of the foot both being free. The band which extends up on to the dorsum of the foot should be

FIG. 1.

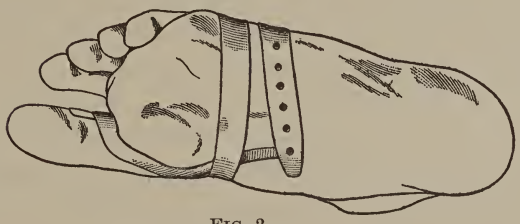


FIG. 2.

FIG. 3.

NEW SPLINTS FOR CORRECTION OF HALLUX VALGUS. (GOLDTHWAITE.)
Boston Medical and Surgical Journal.

carried back far enough so that the painful joint is avoided, and should then be curved forward nearly to the base of the toes, so that flexion of the foot is not restricted. The long arm which follows the side of the foot in the splint (Figs. 1 and 2) makes it possible to exert more force for correcting the deformity, and also serves to more perfectly immobilize the splint than is possible with

the appliance shown in Fig. 3. Both splints are made of light spring-steel, and should be carefully fitted before being tempered. Leather straps encircling the foot hold the appliances in position.

Ingrowing Toe-Nail.—Huebscher $\frac{214}{\text{No.54,'93}}$ advocates evulsion of the nail under cocaine, after splitting it longitudinally into two pieces. The two lateral folds are cut out, as well as the posterior border of skin where the nail rests, in order to make an even surface. The bed of the nail is freshened and a Thiersch skin-graft planted on the raw spot.

Roswell Park, of Buffalo, $\frac{9}{\text{Jan.27,'94}}$ gives two suggestions which he has received for improving the nails. One method, suggested by A. M. Veeder, of Lyons, N. Y., consists in simply cutting a piece of ordinary felt-plaster, sold for use in cases of corns or bunions, so as to be the exact size and shape of the nail about which the ulceration is located. The bit of plaster thus shaped and fitted to the nail is to be firmly attached thereto, so as to press aside the overlapping granulations from off the nail. By holding it in this position a minute or two, until it dries and adheres firmly to the nail, it becomes strongly fastened and will stand considerable rough usage; but as an additional security he wraps a strip of isinglass plaster three or four times around the toe, including the felt. If properly applied the relief is immediate, and the cure is complete as soon as the thinned and jagged edge of the nail underlying the granulation has grown out to its normal size.

The other is from Bogman, of Zanesville, Ohio, who advises the removal of a slice from each side of the toe, including the matrix of the incurving portion of the nail. This was done by a mallet and chisel, on his grandmother, at her own request, with good results. His modification of this primitive method is as follows: "Soak the foot in warm water to soften the nail, and then place it in cold water to contract the blood-vessels. With a strong, pointed knife cut, not split, the nail longitudinally along the line of first indication of incurvation from before backward, and carry the incision backward to and beyond the matrix. With another thin knife deepen the incision vertically to two-thirds the thickness of the toe, keeping close to the bone, but avoiding the periosteum. Then incise the flesh on the same side of the toe parallel to the incision in the nail, forming a flap of the integument and as much as may be of the cellular tissue, thus forming

anteriorly a V. Grasping the portion to be excised entirely with the forceps and lifting it to near the matrix, dissect out as thoroughly as possible its full width and depth, removing the matrix intact. Closing the wound with adhesive strips, there is present a hair-line of cicatrix along the side of the nail, but opposite the matrix is a small point which must heal by granulation."

Tousey [1, May 19, '94] modifies Cotting's operation by planting a Thiersch graft on the raw surface at the side of the toe on the second day.

HAND.

Closs, of Dunedin, [557, Apr., '94] reports a case of webbed fingers in a boy aged 8 years, involving the entire hand. Diday's plan of separating the fingers was employed, beginning with the little and ring fingers. At the next operation the thumb and first finger were separated, and, there being deficiency of skin-flap, it was supplied by direct transplantation from the upper arm. In separating the fore and middle fingers a flap of skin from the thigh, sufficient to go up one finger and down the other, was employed; and as there was too much contraction between the ring and middle fingers when they had been separated, two lozenge-shaped flaps were brought around from the palm and dorsum of the hand and sutured to the root of the cleft. The operations extended over a year and ultimately gave good functional use of the hand.

E. Muirhead Little, of London, [451, May, '94] reports a case of congenital contraction of the little fingers of both hands in a girl of 14 years. He divided the flexors subcutaneously on one side, but could not straighten the fingers. He then divided the anterior and lateral ligaments, straightened the finger, and put on a splint. Later on the patient was unable to completely flex the finger, and he therefore tried to correct the deformity of the other hand by forcibly straightening the finger and putting it on a splint. After a time some contraction returned from neglect to wear the splint at night, but the result was more satisfactory from a functional point of view than when the flexors had been divided.

Tubby, of London, [6, Feb. 17, '94] reports a case of "lobster-claw" deformity of the feet and partial suppression of the fingers, with remarkable family history. The patient was one of a family all of whom presented abnormalities of the hands and feet. In his case the feet, which were nearly symmetrical in appearance and

size, gave one the idea of a lobster's claw. The second, third, and fourth toes were entirely suppressed; the great toe was much lengthened, there being two phalanges, but no nail. The fifth toe was also overgrown and seemed to have three phalanges, while a well-grown nail was found in it. Between these digits a wide sulcus was present, closely similar to that found between the forefinger and the thumb in a normal hand; the first toe presented the power of opposing itself to the remaining toe, so that in its action and grasping movements it resembled the thumb of man. The hands had but one finger, corresponding in position to the fifth finger,—the thumb, first, second, and ring fingers being entirely suppressed,—while the metacarpus was normal. The deformity has persisted nearly constantly through four generations, and in the later generations is more marked than in the earlier. The ancestors, J. G. and his wife, were perfectly formed in the hands and feet, while the abnormalities were transmitted indiscriminately through males and females, although in no instance was there any relationship between husband and wife in any one generation. It was not possible to trace any cousinship. The curious shape of the feet is much more persistent than the suppression of the fingers; of 22 descendants of J. G. 13 had but 2 toes on each foot, with the prehensile movements of the great toe; 1 had but 1 toe on each foot, and 1 had 1 toe on the left foot and 2 on the right foot. Ramsay Smith $_{\text{July 2,'94}}^{2}$ reports a somewhat similar case, a boy and his father having precisely similar deformities of the hands, and seven other members of the family being afflicted with almost identical malformations of the hands and feet,—withered fingers and supernumerary toes.

T. S. K. Morton, of Philadelphia, $_{\text{Mar.17,'94}}^{9}$ reports two cases of congenital hypertrophy of the fingers in one of which amputation was done after other means failed. Microscopical investigation showed the hypertrophy to extend to all the structures of the fingers and tremendous increase of the adipose and connective tissue. The second case showed hypertrophic nodules and dark, livid spots, the skin, subcutaneous vessels, and adipose connective tissue alone being diseased.

Under elastic pressure and constant application of 10 per cent. of ichthyol in lanolin, marked improvement has taken place in six months and ultimate disappearance of the hypertrophic

nodules appears probable. The cutaneous circulation has also markedly improved and the angiomatous condition is disappearing. The groove upon the forearm is likewise growing smaller.

TENORRHAPHY.

Lund, of Boston, $\frac{1}{\text{Sept. 23, '93}}$ gives a report of a series of cases of tenorrhaphy, a *résumé* of the previous reports of cases, and an extensive review of the various methods that have been advocated for finding and also for securing the severed ends. Hæmorrhage must be stopped by the Esmarch bandage or tourniquet applied high enough up not to include the muscles whose tendons have been cut. If the retracted ends cannot be brought into view by flexion or extension, it may be possible to do so by applying an Esmarch bandage from above downward, and so forcing the tendon out of its sheath. If this fail the skin-incision may be enlarged transversely, or, should this procedure not succeed, a longitudinal incision may be made parallel to the tendon, but not directly over it, to avoid the danger of adhesions through having the skin-incision directly over that of the tendon-sheath. If the tendon is much retracted, in preference to slitting up the tendon-sheath Madelung's method is advocated,—namely, a small longitudinal slit in the sheath as nearly as possible where the tendon-end lies, withdrawing the tendon-end through this incision, tying it by fine, strong suture to a probe, and then, by inserting the latter in the sheath and withdrawing it through the cut end of the latter, drawing the tendon back into its sheath and out at the opening, where it can be sutured to the peripheral end. Both silk and catgut seem to be safe material for sutures. In the discussion upon this paper, Marcy, of Boston, advocated animal ligature, preferably kangaroo-tendon, as better than either from an histological stand-point. General anæsthesia is preferable to local, as the patient may involuntarily tear out the sutures from muscular contraction unless completely relaxed. Sutures simply passed through the end of the tendon and tied will hold if enough of them be employed. The method recommended by Witzel depends upon these alone and has given excellent results in practice. It consists in passing a single "tension-suture" of coarse or medium catgut through both ends of the tendon at a distance from the point of section, drawing by this the ends together and

tying it. The edges may then be accurately approximated by finer sutures of adjustment (Fig. 1).

A method which combines the advantages of being easy to execute and of bringing the tension of the suture against a greater resisting surface and in part transverse to the fibres is a modification of the quilt-suture described by Wölfler, which will be easily understood by referring to the diagram, bearing in mind that at each interruption in the suture-line the needle is passed clear through the tendon and back again at the next; so that on section our suture will look like Fig. 3.

The method employed in Billroth's clinic consists in including a bundle of fibres from the side of the tendon in each suture, tying the suture around that bundle, including a similar bundle

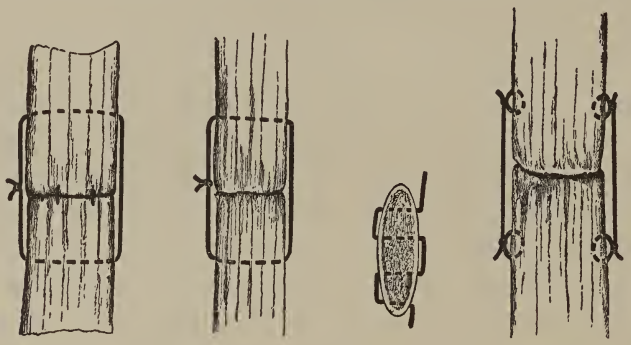


Fig. 1. Fig. 2. Fig. 3. Fig. 4.

Tenorrhaphy. (Lund.)
New York Medical Journal.

from the other end of the tendon, and tying that also; so that, when tension is placed upon the suture, its direction, instead of being parallel to the tendon-fibres, is almost at right angles. This method has been objected to as likely to cause strangulation and necrosis of the included fibres. In practice, however, it has given excellent results, and the above objection has not been found to obtain. Where there is great danger of tension on the sutures, the method of Nicoladoni may be employed. This consists in fixing the central end of the tendon to the skin at some distance above the wound by an acupuncture-needle or deep suture. The ends of the tendon are then united by ordinary sutures. The quilt and Billroth sutures are simpler than this, and are to be preferred in general. Operations for supplying a defect in a ten-

don, however, where we may find difficulty in suturing with the requisite strength, may be greatly facilitated by this method.

A certain amount of hæmorrhage after closing the wound seems to be desirable on theoretical grounds, as the tendons repair from their sheaths, and not from themselves, and so a certain amount of blood-clot is necessary for the feeble granulations to build upon. The cases that were reported by Lund, however, were not treated on Schede's plan, hæmorrhage being arrested as thoroughly as possible before closing the wound. As the cases did very well, the matter still seems open to question.

TORTICOLLIS.

John Lovett Morse, of Boston, $^{51}_{\text{Nov.,'93}}$ reports a case of probably rheumatic torticollis associated with erythema nodosum, which disappeared at the end of five days. Wharton Sinkler $^{19}_{\text{Jan.13,'94}}$ describes two cases of spasmodic torticollis cured by fluid extract of conium-seeds in 20- and 30- drop doses three times a day, the dose at the commencement being 5 drops three times a day. Improvement began in nine days in one case, and was complete in less than a month in both, though one had suffered more than four years.

Kuhn, of Elbeuf, $^{203}_{\text{Jan.15,'94}}$ reports a case of spasmodic torticollis following an attack of pneumonia which was cured by extension, by means of weight and pulley, while the patient lay on the back in bed. The traction was not kept up constantly, but for some hours at a time, and then intermitted for awhile.

Francis, of Hull, $^{6}_{\text{Nov.11,'93}}$ reports the case of a trombone-player who suffered from spasmodic wryneck, which came on after unusually-severe work in a concert-hall. Rest and medical treatment producing no effect, section of the spinal accessory was tried, with the effect of stopping the spasms. These recurred slightly after a week, and slight delusions to which the patient had been subject for some time became so marked that he had to be confined in an insane-asylum for a week. He eventually recovered completely, but on resuming his occupation slight spasm returned, ceasing, however, when he changed his instrument to the bass-viol.

INTERMITTENT LIMP.

Bouchaud, of Lille, $^{220}_{\text{Mar.10,'94}}$ describes this peculiar condition, which has been found quite frequently in horses, but rarely in

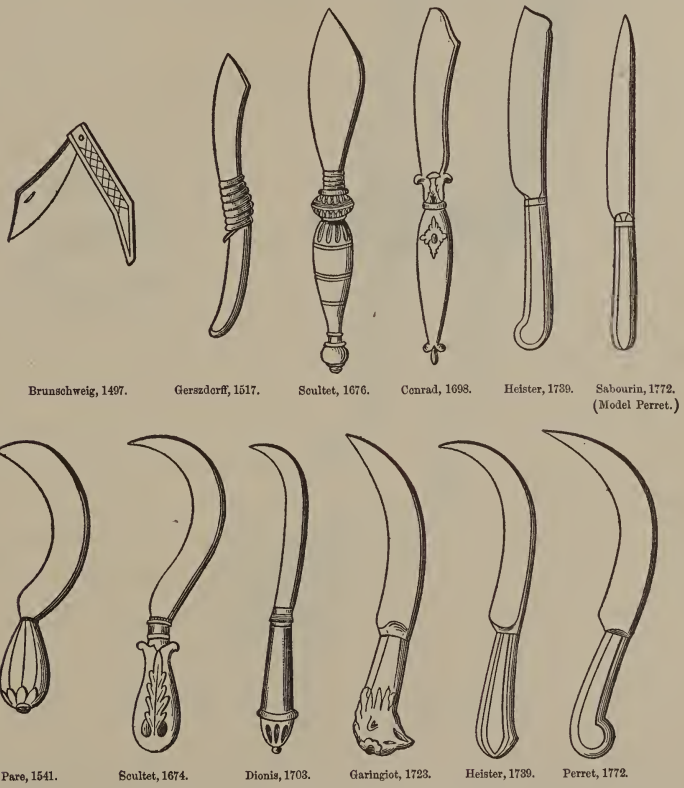
mankind. It was first mentioned by Barth in 1835, and Charcot wrote a memoir on it in 1858, his patient being a man who had been shot in the abdomen, and who exhibited at the autopsy an aneurism of the right iliac artery which was completely obliterated for its lower third. In the horse, an animal which seems outwardly healthy becomes lame. He is allowed to rest, and appears to be sound once more; after perhaps fifteen minutes driving he becomes lame again, and if urged on limps worse, breathes hard, trembles all over, sweats profusely except in the affected leg, and, if pushed still farther, rolls on the ground as if he had colic. The lame leg retains sensibility, but its temperature is lowered. The pulse cannot be felt in it, and it resists efforts at passive motion, though the animal makes attempts to move it, showing that it feels pain. After twenty or thirty minutes the temperature returns to normal; circulation begins again; pain, anæsthesia, and contracture disappear, and the animal can trot without limping. The author records a case in a man of 54 years, with no previous history of sickness or injury except a fall on the head at the age of 8, which rendered him slightly deaf in the left ear. For some months he had had pains in the outside and upper part of the left leg, more severe on exertion. These increased, and after twenty minutes' walking would become so bad that he was obliged to stop or else walk very slowly. The pain was accompanied by a feeling of great weakness and coldness of the foot, the toes of which grew livid. Physical examination showed him to be in good health, except that no pulsation could be felt in the popliteal artery of the left leg, which was like a rigid cord. The temperature of the left foot was at times as much as 5° C. (9° F.) lower than the right. After a time the circulation in the left leg regained its normal characteristics, and with it the pains diminished, but did not entirely disappear; he became able to stand and walk for as much as two hours at a time without trouble.

Després $\frac{100}{\text{Apr.12,'94}}$ describes a contracture of the popliteal aponeurosis similar to that which takes place in the palmar fascia in Dupuytren's contraction. The patient was rheumatic. There was a hard bridle under the skin in the centre of the popliteal space in the line of the vessels and nerves, but more superficial, and on it were three nodules. The leg could not be extended beyond one hundred and fifty degrees.

AMPUTATIONS, RESECTIONS, AND PLASTIC SURGERY; DISEASES OF BONES AND JOINTS.

By P. S. CONNER, M.D.,
CINCINNATI, O.;
AND
LEONARD FREEMAN, M.D.,
DENVER, COLO.

C. Streisguth [197 Feb.20,'94] reviews the history of the curved amputating-knife. The surgeons in past times called all large surgical



FORMS OF STRAIGHT AND CURVED AMPUTATING-KNIVES. (STREISGUTH.)
Revue Médicale de la Suisse Romande.

knives razors, irrespective of their uses, and the blades (see illustrations) for a long time retained a razor-like shape. The curved amputation-knife was not employed until the end of the sixteenth

century, and was banished from the surgical armamentarium during the first part of our own century.

Witzel [336 June 9,'94] claims that neuralgias of stumps are caused by the adhesions of the divided nerves to the ends of the bones or to a cicatrix, and not merely by the formation of neuromata. Particular attention should be paid to the high division of nerves

TOURNIQUET-CLASP. (H. AUGUSTUS WILSON.)
American Lancet.

during an amputation, especially at the ankle and shoulder. These ideas, however, as pointed out by C. Hübscher, of Basel, are not new.

A simple and effective tourniquet-clasp is made, according to H. Augustus Wilson, [234 Feb.,'94] by twisting a piece of wire into the shape of a letter **S** and applying it as shown in the illustration.

Credé, of Dresden, [22 May 30,'94] considers that the Esmarch strap is at times a disadvantage during amputations, fewer vessels requiring ligation when it is not employed. He also discards drainage and sutures, bringing the flaps together by means of equable pressure with gauze bandages. In 22 cases thus treated the results were satisfactory, the stumps being in excellent condition at the end of ten days. Gussenbaum and von Esmarch agree with Credé.

A. H. Meisenbach, of St. Louis, [96 Sept.,'94] made two successful amputations of the thigh according to Neudorfer's method, described in the ANNUAL for 1892, in which the bone is first divided with a chisel, as in an osteotomy, and the soft parts subsequently severed in the line of division, the muscles being separately united by catgut sutures.

Hip-joint.—In certain cases of malignant growths or tubercular invasions, which are not amenable to ordinary operative interference, Jaboulay [211 Apr.15,'94] recommends the removal of the lower extremity, together with the ilium, at one operation, disarticulating at the symphysis pubis and the sacro-iliac junction. He has operated once unsuccessfully. Charles McBurney, of New York, [96 Aug.,'94] while making a successful amputation at the hip-joint for a vascular sarcoma, controlled the hæmorrhage by means of direct digital pressure on the common iliac, through an incision in the abdominal walls. During the operation an intra-venous injection of salt water was made in order to anticipate and prevent shock,—an idea apparently original with McBurney. Abbey suggests that considerable blood may be returned to the body of such a patient by keeping him in the Trendelenburg position for fifteen minutes before the operation. From a number of experiments on dogs, Dawbarn maintains that the saline solution acts much better when employed at a temperature of 130° F. (54.4° C.), as hot as can be borne by the hand. Albuminoid tissues do not coagulate under 160° F. (71° C.). He has used such solutions a number of times during operations at the New York Polyclinic, with good results.

W. L. Estes [787 Jan.,'94] reports seven amputations at the hip-joint by the "bloodless gradual dissection method." He emphasizes the point that the prime factor previous to and during every major operation is prevention of loss of blood, as shock may in this way be largely eliminated.

John A. Wyeth, of New York, [9 Dec.9,'93] reviews 40 amputations

made according to his "bloodless skewer-method." Following the suggestion of Murdoch, of Pittsburgh, he does not now divide the bone at once, but employs the entire limb as a lever in disarticulating, which act he endeavors to complete before removing the tourniquet. The author summarizes as follows: The limited number of cases—40 in all—gives a death-rate of 22.5 per cent. (5 were re-amputations):—

	Cases.	Deaths.	Per Cent.
Sarcoma,	17	2	11.76
Inflammatory bone disease,	18	3	16.6
Violence,	4	4	100.0
Nerve-injury,	1		
For disease,	36	5	13.88
For injury,	4	4	100.0

Ashhurst's table of 633 cases gives a mortality of 64.1 per cent.:—

	Cases.	Death-Rate Per Cent.
For disease,	276	40.2
For injury,	309	82.4

Luning gives:—

	Cases.	Death-Rate Per Cent.
Gunshot wounds,	239	98.0
Disease,	153	42.0

F. W. Parham, of New Orleans, $^{61}_{\text{Dec.23,'93}}$ maintains, with Murdoch, that Wyeth's method of amputating at the hip-joint is the best yet devised. He recommends, however, Lanphear's modification, in which the outer pin is placed high enough so that disarticulation may be accomplished first, and without loss of blood. He reports one successful case. N. P. Dandridge, of Cincinnati, describes $^{9}_{\text{Jan.20,'94}}$ two successful cases of amputation at the hip-joint, in which hæmorrhage was controlled by transfixion-pins and elastic compression. His method is somewhat different from Jordan's or Wyeth's, and similar to that of Senn, in that he constricts separately the anterior and posterior halves of the soft parts of the thigh. Instead of using rubber tubing for this purpose, however, he employs steel pins, about the ends of which he winds the tubing in the form of a figure-of-eight. The lateral incision is made first, and the anterior pin inserted in the upper portion of the wound, through the muscles of the thigh, close to the bone. The head of the bone is then disarticulated, after which the second pin is inserted posteriorly to the bone, its point coming out internally, near that of the first pin. The advantage

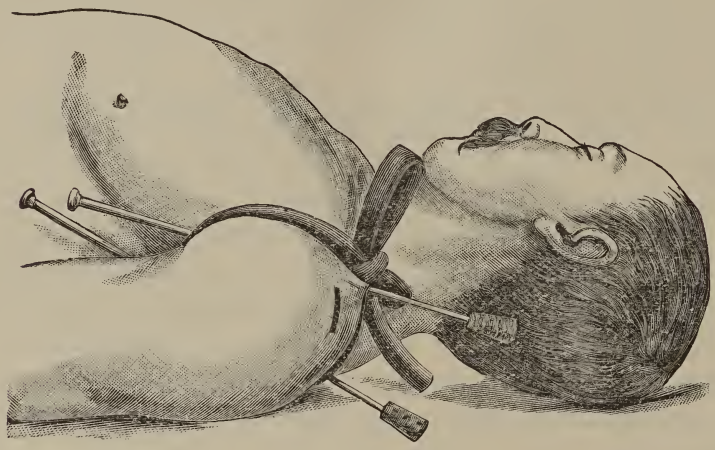
over Senn's procedure is that a firm basis is secured for the compression of the rubber tubing, as it would seem that, in a very muscular limb, the tubing alone would scarcely be sufficient.

W. H. Buechner, of Youngstown, a pupil of Volkmann, [57 Feb.24,'94] claims that the principle of Wyeth's bloodless amputation at the hip-joint was originated by Brashear in 1806, and re-introduced by Volkmann seventy-five years later; this, in spite of the fact that the surgeon whose name the operation now bears has been unable to find reference to it in the books which he has consulted. Wyeth [59 Feb.10,'94] replies that the methods are similar, but not identical. W. F. Arnold (Surgeon, U. S. N.) [59 Mar.24,'94] also maintains Brashear's priority in the operation.

Shoulder.—W. W. Keen, of Philadelphia, [5 June,'94] discusses amputations of the upper extremity (including the scapula and clavicle) and of the arm at the shoulder-joint, with special reference to methods of controlling hæmorrhage, giving a report of one case of the former amputation and four of the latter. He strongly advocates Wyeth's method of securing the arteries at the shoulder as being much more reliable than others to which he briefly refers. The method is as follows: "The patient is brought to the edge of the table, with the shoulder projecting somewhat beyond the edge. The arm is held at a right angle to the body. Two sharp-pointed, cylindrical pins, eleven inches long and one-fourth inch in diameter near the head (No. 20, French catheter scale), are used. I have found that a good deal of force is required to push the pins through the tissues, and would suggest that the points be made triangular, like that of a trocar, to facilitate their introduction. The anterior pin is introduced through the middle of the anterior axillary fold (tendon of the pectoralis major), at a point a little nearer to the body than what may be called the centre of the fold transversely. The point of emergence of the pin is of much greater importance than the point of insertion; this should be an inch within the tip of the acromion (see illustration on next page). The pin being pushed through, the point is protected by a sterilized cork. The second pin is now introduced at a corresponding point through the posterior axillary fold (tendon of latissimus dorsi), emerging again an inch within the tip of the scapula. The exact point of emergence is, as I have said, important, in order to avoid the precise objection which Treves adduces,—namely, that if

the pin emerge near or at the tip of the acromion, the moment the head of the humerus is removed the tubing is apt to slip downward, compress the two flaps against each other, and thus hide the cavity formerly occupied by the head of the humerus," and copious hæmorrhage may result.

In cases where the axilla is so extensively invaded that Wyeth's pins cannot be used, Keen recommends, and has employed successfully, the method devised theoretically by Dalpech, and described by that author as follows:—



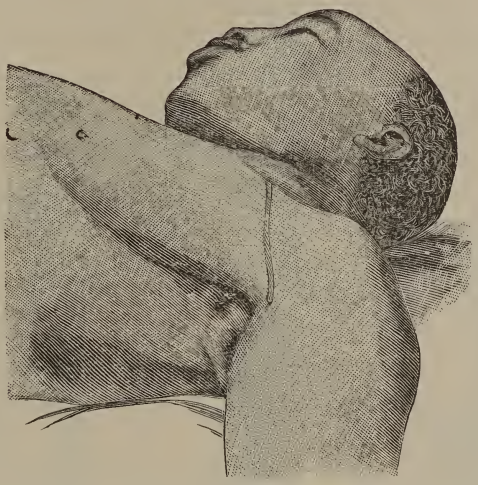
Amputation at Shoulder, showing Wyeth's Pins and Rubber Tubing in Place. A Piece of Black Court-Plaster Indicates the Tip of the Acromion. (Keen.)

American Journal of the Medical Sciences.

"An oblique incision is made, extending from the external third of the clavicle to an inch above the inferior border of the great pectoral muscle (see illustration on next page). We thus discover and can cut, near to its origin on the coracoid process of the scapula, the lesser pectoral. The index finger is then carried through the cellular tissue along the serratus magnus muscle, then the subscapular, . . . and is used as a hook, in order to draw outward the mass of vessels and nerves. The artery is always situated at the anterior part of the mass, is surrounded and, as it were, indicated by the two roots of the median nerve, and nothing is easier than to surround it with a ligature which will embrace nothing else. This process appears to me preferable

in that it produces but little injury to the parts, that it leaves a certain space between the ligature and the trunk, and permits temporary compression of the subclavian artery above the clavicle on the first rib."

In cases in which it is necessary to remove the arm, the scapula, and the clavicle, hæmorrhage may best be controlled by first resecting the middle of the clavicle and securing both the artery and vein, although these are at times difficult to find in pathological cases. The artery should be tied first, as this lessens the amount of blood in the vein, so that it is easier to manage, and accidental tearing is less embarrassing.



Line of Incision Between the Deltoid and Great Pectoral Muscles. (Keen.)
American Journal of the Medical Sciences.

J. H. Brinton, of Philadelphia, $^{65}_{\text{July,'94}}$ describes two cases of amputation at the shoulder-joint in which Wyeth's pins were used to control hæmorrhage.

Leg and Thigh.—A. Ritschl $^{761}_{\text{B.11,H.1}}$; $^{169}_{\text{Jan.,'94}}$ discusses exarticulation of the leg at the knee-joint,—an operation which is seldom performed at the present day. His remarks are based on eight cases in the Freiburg clinic. He finds but eighty-five recorded cases, with a mortality of 14.3 per cent. A long anterior flap has the advantage of throwing the cicatrix posteriorly, but there is a risk of necrosis. This may be largely avoided, however, by keeping the hip-joint in extension for a time after the operation. It is better not to remove the cartilage or synovium, as

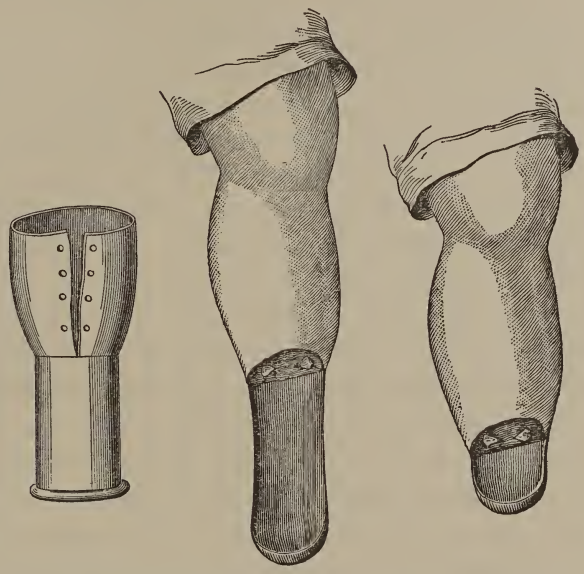
this prevents mobility of the tissues over the end of the bone, which is the one real advantage of a disarticulation at the knee. In fortunate cases a wide, non-resistant, supporting-surface is obtained, the bone having little tendency to atrophy. It is so important in this operation to avoid suppuration that the operation is indicated only when there is a good prospect of primary union. It is doubtful whether it should be undertaken in elderly individuals with arterio-sclerosis, disturbances of the circulation, etc., as gangrene of the flap may result. W. L. Estes $^{787}_{\text{Oct.,'93}}$ amputated both lower extremities through the lower third of the thigh, for elephantiasis, with satisfactory result.

In supramalleolar amputations, especially in the lower classes, it is of great importance to obtain, if possible, a stump upon which the individual can walk directly, without the necessity of wearing a special, expensive apparatus. Bier, of Kiel, attempted to solve this problem (see ANNUAL of last year) by chiseling off a piece of the tibia and placing it horizontally against the remaining end of the bone so as to form a kind of artificial foot; this, however, shortened the leg too much, and a special, expensive shoe was necessary. Ollier modified Syme's operation so as to employ the thick pad of the heel as a covering to the bone. A serious objection to this, however, was the fact that secretions accumulated in the pocket and were apt to undergo septic changes. E. Kummer, of Geneva, $^{214}_{\text{No.3,'94}}$ proposes to operate as does Ollier, but, instead of suturing the flap in place at once, to leave the wound entirely open for perhaps four and one-half weeks. During this time the uselessly-long flap shrinks into place so that it exactly fits the end of the stump, and may easily be united by secondary sutures (see illustrations on next page). The shoe is represented in the illustration, its under portion being of cork capped with rubber. Two successful cases are reported.

In order to prevent the danger of pressure-gangrene over the sharp edge of the tibia in amputation of the leg, Josef Bogdanik $^{336}_{\text{May 26,'94}}$ cuts a short anterior and a long posterior flap, and after they are united by sutures he catches the skin over the tibia into a short longitudinal fold, and holds it in this position by means of a catgut suture.

After measuring 167 thigh amputations and 287 amputations of the leg, Stephen Smith $^{130}_{\text{Nov.,'93}}$ finds that the farther from the trunk

the operation has been made, the greater will be the atrophy of the extremity of the stump and the less the atrophy of its body. Skin-flaps with circular division of the muscles and posterior flaps gave the best results. In the latter the vascular supply remains intact, but the drainage is so imperfect that the operation is not to be recommended. The author insists that an artificial foot can be much more easily fitted to an ankle-stump than a stump made by amputating in the middle of the leg, because the former will bear end-pressure more easily. Gwilym G. Davis $\frac{80}{\text{Aug.15,'94}}$ strongly advocates the utility of amputation through the foot and lower part of



Method of Shortening Flap, and Shoe. (E. Kummer.)
Correspondenzblatt für Schweizer Aerzte.

the leg, contrary to the recent writings of many, including some makers of artificial limbs. He cites cases in support of his views.

In an article on "Amputation Prothetically Considered," George E. Marks $\frac{1}{\text{Jan.27,'94}}$ maintains, contrary to many makers of artificial limbs, that a stump cannot be too long,—that artificial feet and legs may easily be fitted to any stump by a competent maker. He emphasizes the necessity of occasionally bending the knee during the period of recovery, in order to prevent impairment of its mobility. It is desirable to preserve the condyles and articulating surface of the femur, and it is better not to remove the patella.

Stumps should be tightly bandaged from the time they are healed until an artificial limb is obtained, in order to prevent an undue accumulation of adipose tissue, thus rendering them flabby, swollen, and œdematous. It is safe, in traumatic cases, to apply an artificial leg as soon as the stump has definitely healed and the patient has regained his normal vigor. In children it is desirable to apply an artificial limb as soon as possible, in order to stimulate the growth of articulations, etc., by use. Such a prothetic apparatus can be easily lengthened from time to time at slight expense. From a maker of artificial limbs—Edwin Osbourn, of Philadelphia $^{80}_{\text{Aug.15,'94}}$ —comes the statement that the surgeon should save all of a limb possible. A long stump may be more difficult to fit with a suitable apparatus, but it can be done, and "the welfare of the patient is the first consideration, rather than the convenience of the leg-maker." Chopart, Pirogoff, and Syme operations may all be prothetically treated, with satisfaction. When necessary to amputate above the ankle, he advises saving all that can be saved; and always save the knee-joint when possible, no matter how short the subjacent stump may be. Considering what has recently been written by other makers of artificial limbs (see ANNUAL for 1892), it is pleasing to find that some one believes that artificial legs can be made to fit stumps, and that stumps should not always be made to suit the ideas of the instrument-makers. Thomas H. Manley, of New York, $^{40}_{\text{Oct.,'93}}$ writes on amputations about the foot in connection with prothetical appliances. He concludes: "It may be affirmed, then, with every argument that sound logic can advance, that in lesions of the foot, traumatic or pathological, the principle should be enforced of sparing any portion which will preserve its vitality. Should it be discovered later that, as an aid to prothesis, another section will render locomotion more effective and comfortable, it may be made, but not without an understanding with the patient that this latter expedient may not improve his condition."

According to Frederick Page, $^{6}_{\text{June 9,'94}}$ "During the year 1893 74 major amputations were performed in the Royal Infirmary, London, upon 71 patients, 3 of the cases being double amputations, 10 of the patients dying and 61 recovering. This is a mortality of 14 per cent., nearly the same as during the year 1892, and a little higher than in 1891. Twenty-eight of the amputations were for injury. Two men lost both legs, and recovered; 1 lost

a foot and a thigh, and recovered; and 3 patients died after amputation of the thigh. The mortality, therefore, after amputation for injury was 10.7 per cent. For disease, 43 amputations were performed and 7 patients died,—16.2 per cent. Eight hundred and sixteen major amputations were performed during the period from April 1, 1878, to December 31, 1893, upon 804 patients, of whom 70 died,—8.7 per cent. Forty-one of the deaths followed amputations for injury, 274 patients recovering,—a mortality of 13 per cent. Four hundred and eighty-nine of the amputations were for disease, and 29 patients died,—a little over 5 per cent. If from the total of 804 patients all were excluded who died in a few hours after amputation, the mortality for the whole period would hardly reach 5 per cent." A. Mitra, chief medical officer at Kashmir, [1055 July 1,'94] tabulates 300 amputations made in the Kashmir Hospital, with but a single death, which was from pneumonia; and S. H. Pinkerton, of Salt Lake City, [2044 '93] reports 104 major amputations, with a mortality of 9.6 per cent. Successful simultaneous triple amputations have been made by Henry R. Wharton, of Philadelphia, [9 Mar.31,'94] and Benjamin Thompson, of Tama, Iowa. [101 Apr.,'94]

Conical Stumps.—In a paper written in 1890 and noticed in the ANNUAL, C. A. Powers, of Denver, Colo., maintained that conical stumps in children were often due to physiological growth of the bone in excess of the growth of the soft parts. He now adds to this [59 Feb.24,'94] that inflammatory growth, due to pressure of the end of the bone against the skin, might at times somewhat increase this conical shape. He maintains that amputation through the upper part of the humerus or leg of a young child will probably be followed by a conical stump, and that the parents should be warned of this and be prepared for a secondary operation or operations. H. Hirsch [13 June,'94] says that if the stump support no portion of the body-weight directly upon its end, the bone becomes pointed. If a portion of the weight only is so supported, the end of the bone broadens; but if the entire weight come upon the end of the stump, the bone remains unaltered. He speaks strongly in favor of Bier's method of amputating the leg.

Resections.—A new bone-saw, to take the place of the old and exasperating chain-saw, is presented by L. Gigli, of Florence, Italy. [336 May 5,'94] It consists of a simple steel wire, on the surface of which small saw-teeth have been cut by a peculiar process. At

each end of the wire is a detachable handle. A blunt needle enables the operator to thread such an instrument around most bones quite easily, and with care there is little danger of breaking the wire. The cheapness and apparent utility of the apparatus seem to recommend it at once.

Banks[187 July,'94] uses no splints whatever after excision of the shoulder, elbow, and hip, but begins passive motion at once, the day after the operation. He claims thus to prevent ankylosis, and to secure a better substitute for the joint removed. Based on four cases successfully operated upon by Biondi, A. Merea, of Cagliari,[59 May 19,'94] states that free motion of joints which have been subjected to arthrectomy may often be obtained. He concludes that in the after-treatment of arthrectomy it is advisable not to apply any immobilizing apparatus. Active and passive movements ought to be made as soon as possible after the operation, even as early as the second day. Immobilization of resected joints favors the transformation of the synovial membrane into granular tissue, and the denuded articular surfaces then become the seat of osteophytic new growths favoring bony ankylosis.

Knee.—Jaboulay, of Lyons,[73 Feb.10,'94] describes a seemingly practical and satisfactory method of uniting the femur and tibia after a resection of the knee, so that they will remain in place and permit of the dressings being easily changed. He employs a bar of iron twelve centimetres in length and one and one-half centimetres wide, from which project five sharp nails each five centimetres long. These nails, three above and two below, are driven through the skin firmly into the bones, not far enough to press the bar against the integument.

Jules Bœckel[168 Apr.1,'94] gives the results of 20 resections of the knee made in patients over 50 years of age,—11 from 50 to 60 years, 5 from 60 to 70, 3 from 70 to 80, 1 being 82 years of age. All of the cases recovered from the operation itself, although 2 died subsequently,—one, aged 56, of acute mania at the end of three months; the other, aged 82, of acute pneumonia, on the fifty-seventh day. In both cases consolidation was progressing favorably. Thirteen cases operated upon without drainage did better than the seven cases in which drainage was employed. Seventeen consolidations were obtained, the average time required being five or six months. The author concludes that resection of

the knee in those well advanced in years is a perfectly justifiable operation.

Elbow.—Duncan Macartney, of Glasgow, [213 Sept.,'94] reports 30 cases of excision of the elbow-joint, in 13 of which he succeeded in obtaining good active movement, and in 4 restricted movement. There were no deaths. He does not attempt to save the periosteum, but operates by the "open method," and prefers not to employ the Esmarch band, as healing takes place more satisfactorily without it. Passive movement should be begun as early as possible—in favorable cases, during the third week. It at first consists in placing the arm in a rectangular splint one day and in a straight one the next day. In another week or two splints are discarded and flexion and rotation carried out at regular intervals until the joint has recovered.

Wrist.—A. G. Miller, of Edinburgh, [36 Aug.,'94] has much to say in favor of Watson's method of excising the wrist-joint by means of a single, longitudinal, dorso-lateral incision, reaching from a point one and one-half inches above the styloid process of the ulna to the metacarpal bone of the little finger. Through this incision, three inches in length, can be removed the end of the ulna, then the carpal bones, and lastly the end of the radius and the trapezium if necessary. The advantages of the method, according to Miller, are: "1. Only one incision is necessary. 2. Drainage is very efficient, the wound being on the side of the hand which is the lower in the position in which the hand is usually carried. 3. The resulting cicatrix is hardly visible, and therefore the appearance of the hand is fairly natural after recovery. 4. The operation is very easy of performance." He reports ten tubercular cases, and regards it as suggestive of traumatic origin that the right wrist was affected eight times and the left only twice. Five of ten cases recovered at once with useful hands, while three recovered after being scraped.

Ankle and Tarsus.—Heidenhain [336 July 28,'94] recommends excision of the ankle-joint by means of a dorsal flap, as it permits more thorough inspection and removal of diseased tissues than the transverse incision. In most of the cases sensibility returns to the forepart of the foot, and the toes regain at least a part of their mobility. The malleoli should be retained if possible, thus insuring better action of the foot in case some degree of motion should be obtained.

A longitudinal incision is made in the usual way on each side of the foot, extending forward from the malleoli. These incisions are joined by a transverse one far enough forward to insure a thorough inspection of the affected area, and the flap turned up.

Korzeniowski [360 June,'94] reports six Wladimiroff-Mikulicz operations performed in Krajewski's clinic, at Varsovie. Very satisfactory results were obtained in three cases. In the fourth ossification did not take place, but the patient was able to use his foot to good advantage by wearing an appropriate shoe. The remaining two cases died,—one of pulmonary tuberculosis and the other of a cardiac affection. The osseous suture is advocated.

Clavicle.—Total extirpation of the clavicle is discussed by G. Norkur, [336 Aug.4,'94] who has collected 73 cases, 6 of which died from the operation. In 8 cases the result was perfectly satisfactory, and in 2 cases it was not. The results of the other cases are not given. Norkur himself reports one case in which, although there was no regeneration of bone, perfect function of the arm was obtained; hence the author maintains that the bone and its periosteum should be removed as early as possible in cases of malignant tumors.

TUBERCULOSIS OF BONES AND JOINTS.

Some two years ago (see ANNUAL for 1894) Bier, of Kiel, introduced a new treatment for tubercular joints—the "chronic congestion treatment"—in which an elastic constricting band was placed above the joint in such a manner as to produce a certain amount of stasis in the affected part. His experiments have been followed up by Buschke [3 '95] and Mikulicz, of Breslau, [31 Mar.28,'94] with encouraging results. The experience of the latter especially has been very satisfactory in a dozen cases which he has recently reported. Like other forms of treatment, however, it is not always successful, and cases for its use should be selected. A good indication is the rapid amelioration of pain, perhaps in a few days. If the pain is augmented the treatment should be discontinued. The duration and degree of constriction should be regulated by the reaction of the part and the sensations of the patient. At first the constriction must be slight and continued only a few hours; but as the case progresses, it may be gradually increased until it continues day and night. Naturally it must not be continued too long, or atrophy of the parts below will result. The point of application

of the ligature should be frequently changed, to prevent local ill effects of pressure. After eight or nine days iodoform injections may be advantageously employed in connection with the Bier treatment. It is still a question whether the constriction treatment acts directly by venous stasis, by the accumulation of serum, or by a sort of "auto-tubercularization." Bier [22 May 30,'94] spoke very encouragingly of his method of treatment at the last German Surgical Congress; but Zeller, of Berlin, was not so enthusiastic, having seen complete recovery in but one case.

After making numerous bacteriological, chemical, and histological experiments and investigations as regards the curative effects of iodoform in various affections, especially tubercular, L. V. Stubenrauch, of Munich, [116 May,'94] arrives at the following conclusions: 1. Iodoform is not an antiseptic in the strict sense of the term, and probably possesses no specific antitubercular properties. The effect which it undoubtedly has upon tubercle bacilli in the body is probably due to its action upon the tissues rather than upon the bacteria. 2. Iodoform becomes decomposed both without and within the body. 3. It only acts upon the tissues when decomposed. Its mode of action upon tubercular tissues probably consists in the fact that it hastens the destruction of unstable pathological elements, and augments the resisting powers of those which more nearly approach a healthy state.

Coudray [14 Oct.18,'93] reports one hundred and thirty-six cases of tubercular osteo-arthritis treated by Lannelongue's sclerogenic method (injections of 10-per-cent. solution of chloride of zinc). He carefully divides the cases into suppurative and non-suppurative, and mentions the partial recoveries and non-recoveries, as well as those completely relieved from the local disease. The best results were obtained in the knee, followed by the ankle, elbow, and wrist. The chances of recovery when the hip and spinal column are affected are less. Out of 52 non-suppurative cases 32 (perhaps 36) recovered with the use of the injection alone (61 to 69 per cent.). The suppurative cases generally require some sort of an operation, such as curetting of an abscess or of sinuses; but these operations are trivial compared with the resection of a joint and the division of its supporting ligaments, and leave the extremity in a much more desirable and useful condition. Mauclaire [14 Oct.15,'93] writes on the different forms of tubercular osteo-arthritis and their

treatment by Lannelongue's sclerogenic method alone or in combination with early and perhaps repeated arthrectomies.

E. Kirmisson [17 May 5,'94] highly recommends deep ignipuncture in the treatment of tubercular arthritis. The joint must be sterilized as thoroughly as for any other surgical operation, so as to avoid subsequent suppuration. Those points most prominently affected by fungous degeneration are selected, and perhaps a dozen or more punctures are made, the patient being under an anæsthetic. A surgical dressing is then carefully applied. The thermo-cautery is far superior for the purpose to the old cautery-irons. The process is more applicable to the cases in which fistulæ have not yet formed. Eight cases are reported, five of which were cured and the others much benefited.

Jeannel [1088 Jan.7,'94] employs water, heated to more than 100° C. (212° F.), as an antiseptic to be used in conjunction with operative measures in various tubercular affections of joints, etc. The tissues are treated with this hot water for five or ten minutes, and the results are said to be remarkably good. Steam may be used for the same purpose; but its action is more difficult to control.

Knee.—Polaillon [55 Nov.18,'93] reports 106 cases of tubercular joints. His statistics are: 59 men,—30 not operated upon: 3 recovered, 20 improved, 5 unimproved, 2 deaths. 29 operations: 26 recovered, 1 improved, 1 not improved, 1 death. 45 females,—35 not operated upon: 7 recoveries, 17 improved, 8 not improved, 3 deaths. 12 operations, with 12 recoveries.

De Forest Willard [40 Nov.,'93] has written an exhaustive article on the operative treatment of knee-joint disease. His conclusions are: "1. Mechanical treatment, by rest, fixation and the use of crutches, either axillary, perineal, or ischiatic, is absolutely essential both before and after operation. 2. In children under 12 years of age conservative measures should be carried to the extreme, and all operative procedures should tend to non-interference of the epiphyseal line for as long a period as possible, in order to assist growth of the limb. In these young cases, therefore, tenotomy, with subsequent fixation, should be the primary procedure, to be followed by erasion when necessary, and by excision only when life is absolutely threatened. 3. From 12 to 15 years of age conservatism should still be the rule, although the dangers from a shortened limb subsequent to operation are not so serious

after growth has been completed. In adults operative treatment should be early and more radical in character, erasion still being preferable to excision, except in very degenerated cases. 4. Amputation should be employed in children only as a last resort; in adults with extensive disease it is often a wise procedure. 5. The introduction of antibacillary substances, both extra- and intra-articular, offers hope of retardation in the growth of bacilli; but as yet the procedure is in the experimental stage. 6. After the subsidence of all inflammatory symptoms the late deformity should be overcome (*a*) by tenotomy, with forcible replacement; (*b*) by excision; rarely by osteotomy."

The mechanical treatment of osteitis of the knee is considered by Henry Ling Taylor, of New York, $^{1}_{\text{Nov.18,'93}}$ and B. E. McKenzie, of Toronto, Can. $^{39}_{\text{Sept.,'93}}$; while Gilbert Barling discusses some of the pathological aspects of bone tuberculosis. A. B. Judson, of New York, $^{61}_{\text{Nov.18,'93}}$ writes on the treatment of white swelling of the knee; and J. D. Griffith, of Kansas City, Mo., $^{814}_{\text{Nov.,'93}}$ reviews the history of the treatment of the same affection, and speaks strongly in favor of Max Schüller's guaiacol treatment.

Tarsus.—Jules Bœckel $^{168}_{\text{Oct.1,'93}}$ reports the results in 30 cases of tarsectomy for tubercular osteo-arthritis. There were no deaths due to the operation; 24 of the cases remained definitely cured; 2 required subsequent amputation; 2 died in time from tubercular meningitis and 2 from phthisis pulmonalis. The cases are tabulated as follows: "(1) extirpations and curetting of calcaneum, with 10 recoveries at the end of seven years; (2) 11 extirpations of the astragalus, with 10 cured (the oldest made eleven years ago); (3) 8 total tarsectomies, with 4 recoveries (eight, twelve, and eighteen years under observation)."

In a clinical lecture on the treatment of tubercular disease of joints, W. Arbuthnot Lane, of London, $^{1077}_{\text{July 4,'94}}$ strongly emphasizes the statement that much more satisfactory and useful joints are obtained when patients recover without operative treatment, no matter how skillfully the operation may have been performed, and no matter how young the individual. "Therefore, before having recourse to operative interference in tubercular disease of a joint, assuming that there are no symptoms which urgently demand such, it is obvious that every effort should be made to obtain a cure by such means as we possess, viz., the following: (*a*) careful

attention to the diet and hygiene of the patient; (*b*) the retention of the diseased part in such a fixed position that a minimum degree of movement is permitted in the affected joint; (*c*) the internal administration of such drugs as inhibit or influence prejudicially the growth of tubercular organisms, such as the various iodides, mercury, and arsenic, the last in increasing doses. Under this method of treatment a considerable proportion of cases affected with tubercular joints will recover completely. When the disease is limited to the synovial membrane, and the cartilage is only superficially eroded, a complete erasion of the diseased structures is almost always followed by a satisfactory result." The author strongly advocates the complete packing of all cavities left in the cartilage with dry iodoform sterilized by soaking in 5-per-cent. carbolic acid. He has also had excellent results from the use of sulphur as an antiseptic in tubercular tissues, his conclusions being as follow: Sulphur appears to exert no deleterious influence on the health of the patient. It gives rise to products which are powerfully caustic in their action; so that the drug must be used in small quantities and with discretion. The most active agent produced is apparently sulphuric acid. It destroys all organisms, whether free in a cavity or invading the surrounding tissues. It acts more powerfully upon recently-incised structures than upon granulating surfaces. Its action is rendered more uniform and general and less violent by mixing it with glycerin. If the drug be used in any quantity, it must be removed within a few days. Twenty-four hours is usually sufficiently long for the sulphur to produce its destructive action in a recent wound. In some cases it may be necessary to scrape away the sloughs together with the remaining sulphur; but, as a rule, more or less frequent irrigation with a dilute perchloride-of-mercury lotion is sufficient, the wound being subsequently retained aseptic by suitable precautions. The author also insists upon the advisability of outward rotation of the limb in tubercular hip disease, and upon the fallacy of keeping the foot in a vertical position, which tends to encourage pathological dislocation.

From a study of some three hundred specimens, König, of Göttingen, $\frac{336}{\text{June 2,'94}}$ has come to the following conclusions regarding synovial tuberculosis of joints: 1. Synovial tuberculosis, whether primary or secondary, begins always with a sero-fibrinous exuda-

tion (hydrops sero-fibrinosus), which is not a distinct form of tuberculosis, but merely, as in other serous sacs, the first sign of disease of the membrane. 2. At times this exudation becomes absorbed without leaving the joint essentially injured. Much more frequently, however, the process extends, fibrin is deposited on various portions of the synovium in layers of varying thickness and extent, which gradually become organized and penetrated by vessels from the underlying membrane. As soon as the vessels appear, tubercles begin to form, and their number decides the character of the new tissue—whether fungous, granulating, caseous, etc. As long as the disease is progressive, an unorganized layer of fibrin is to be found upon the surface of the organized portion. 3. Both the healing and breaking down of the joint begin in this new tissue, and proceed from the surface inward, and not, as has been supposed, from bone-foci outward. The destruction is carried on by means of granulations which eat their way into the cartilage, which remains entirely passive. It is not at all necessary that these granulations contain tubercles. The same thing occurs beneath layers of fibrin deposited directly from blood in the joint-cavity. When the bone is reached, tubercular foci are formed which cannot be distinguished from primary bone-foci in appearance or extent. In fact, the entire subject of the frequency of primary tubercular foci in bone must be revised, their number being certainly less than has been supposed. Finally, it should not be forgotten that the healing process is carried on through the formation and contraction of cicatricial tissue in the deposits of fibrin.

The same author $\frac{226}{\text{B.44,S.592}}$; $\frac{112}{\text{Feb.,'94}}$ reviews the treatment of tuberculosis of joints. Post-mortem examinations made by him have demonstrated that four-fifths of all cases of bone tuberculosis originate from some other focus of the disease. He affirms that, with our improved methods of treatment, at least one-half the cases recover without operative treatment, and that operation should not be hastily resorted to. Partial operations on the joints, with the removal of foci of disease, are recommended for children, but are usually not radical enough for older patients.

Hermann Wynter $\frac{170}{\text{Dec.,'93}}$ urges the early removal of tubercular epiphyseal bone-foci by means of the trephine and sharp spoon, so as to prevent extension of the disease and involvement of the joint.

"The main symptoms of a local focus in its early stage, near the epiphyseal cartilage, are: diminished extreme extension and flexion, while the motion is free in the middle ranges; slight atrophy and commencing muscular contractions; starting pains; increased surface-temperature; and pain on tapping over a circumscribed area."

The subject of malposition and pathological luxation in tuberculosis of the knee-joint in children is discussed by A. Guillemain. [118 July,'94] The deformities usually come on slowly and progressively, rarely suddenly. They may be divided into: 1. Genu valgum, an exceptional variety due not to the position of the limb while in bed, as suggested by Bonnet, but to irregular disease of the bones forming the joint. 2. Simple angular deformity; not a frequent variety, the angle being usually a complex one. 3. Complex angular deformity, which is very often met with, and consists in backward and outward luxation of the tibia, with diaphyso-epiphyseal incurvation of the bone. The cause probably lies largely in irregularities of growth of the epiphyseal cartilage of the lower end of the femur, giving rise to malposition of the articulating surfaces. 4. Luxation of the bones of the leg into the popliteal space. The best treatment is to prevent deformity by means of suitable plaster casts. If the damage is already done, it should be remedied under an anæsthetic, or more slowly as circumstances may indicate, and a suitable apparatus applied.

D'Arcy Power [1077 Aug.22,'94] states that the passive enlargement of bursæ in the vicinity of joints in children is a valuable sign of beginning tubercular arthritis, and reports nine cases. The joint in such a case should be placed in a state of physiological rest at once, so as to head off the impending disease. If there be much passive effusion, it should be drained by an incision rather than by aspiration, as such tubercular processes—for instance, tubercular peritonitis—seem to require free drainage.

Interesting articles on surgical tuberculosis are by Frederic Eve, of London [2 Aug.29,'94]; E. J. Farnum [192 Dec.,'93]; W. E. Ground, of Wisconsin, [105 Dec.15,'93] and Lannelongue. [996 Apr.10,'94]

DISEASES OF BONES.

Necrosis.—Most cases of necrosis of the skull, according to W. Willemer, [13 Aug.,'94] are due either to syphilis or tuberculosis; but there are numbers of cases for which no satisfactory explanation

can be given; perhaps they follow an injury, or perhaps they arise without apparent cause. As soon as the difficulty is recognized the dead bone should be removed, and also that surrounding portion which has undergone any observable change.

Leser, of Halle, [336 July 28,'94] discusses what he terms the "dry necrosis" of bones. It sometimes happens in a compound fracture that a portion of bone, instead of remaining vascular and becoming covered in by granulations, actually dries out and remains dead and white in the wound. To prevent this, such bones should be kept moist by appropriate aseptic dressings. When death of the part has once occurred, the dead bone should be thoroughly removed at once. Bardeleben, of Berlin, however, calls attention to the fact that these ideas are not new.

Periostitis.—P. Chatin, [211 Sept 2,'94] in spite of the opinions of quite a number of authorities, insists on the existence of a rheumatic osteoperiostitis, and presents the notes of a case. After a careful analysis of the fluid obtained in a case of albuminous periostitis, Hugounenq [211 Mar.18,'94] comes to the conclusion that it is practically identical with the fluid in hydrarthrosis. The significance, however, of this similarity, as regards origin, etc., has still to be ascertained.

Osteomalacia.—In an article on osteomalacia in the male sex, F. Strauscheid [69 Nov.30,'93] quotes Litzmann as stating that, in 131 cases, 8.4 per cent. occurred in men and 91.6 per cent. in females. It must be remembered, however, that the most striking symptom —difficult childbirth—being, of course, absent among males, the disease must often be overlooked. Löhlein [13 Sept.15,'94] lays great stress upon the operation of castration in osteomalacia not only as regards its immediate benefits, but in the ultimate favorable progress of the case. He has operated upon eleven cases. He recommends the procedure in those forms of the disease which, in spite of an extended treatment by ordinary methods, still persist, and would even operate, contrary to Winckel, when life is not threatened. He would not consider castration as directly curing the disease, but only as a substantial aid in that direction. Schlesinger, [57 Oct.23,'93] in speaking of the treatment of osteomalacia, warns against the use of too large doses of phosphorus, or poisoning may result.

In discussing osteomalacia, W. Latzko [57 Jan.21,'94] maintains that the

disease is not at all endemic, and that its victims are not unusually prone to bear children; although the affirmative of these two points is insisted upon by most authors. The fact that only certain men have been interested in the disease and are capable of observing it tends to make it appear endemic. When these men die "the disease dies with them." The affection attacks not only the bones, but the joints, ligaments, and especially the muscles, which undergo fatty and fibrous degeneration. A characteristic early symptom is paralysis of the muscles of the hip, especially the ilio-psoas, which gives rise to the peculiar gait. Patients cannot raise the foot slowly in front nor ascend stairs without much effort. We have the choice of three certain methods of treatment, —phosphorus, castration, and the Porro operation,—each applicable to its own class of cases. Latzko $_{\text{Jan.14,'94}}^{57}$ substantiates Petroni's assertion that chloroform narcosis exercises a marked influence upon the disease, but does not agree with that author in his belief that the benefits of castration, etc., are due to the chloroform alone. The relapses following apparent cures by chloroform, etc., the author attributes to processes going on in the generative system,—pregnancy and return of menstruation.

As is well known, Petroni considers osteomalacia as due to a micro-organism, which he claims to have discovered in the blood of patients. He states that he has produced the disease in dogs by injecting this microbe into their circulation. Nitrous acid is always found in the urine, which he claims is manufactured in the blood by the germs of the disease. This acid is supposed to act upon the bones and deprive them of their mineral elements. In an undoubted case of advanced osteomalacia in a woman of 26 years, who had borne several children, Tschistowitsch $_{\text{Apr.25,'94}}^{126}$ could find no trace of a micro-organism in the blood, after repeated examinations. At times he obtained in the urine more or less nitrous acid, but he also found it in cases of pneumonia, pleurisy, etc.

Von Schrötter $_{\text{No.51,'93}}^{8}$ reports a case of osteomalacia in a man, combined with tabes dorsalis. He has been able to find in the literature but fifteen cases of osteomalacia in men, and is of the opinion that many patients supposed to be suffering from myelitis or chronic rheumatism are really affected with osteomalacia. Grawitz remarks, however, in reviewing Schrötter's articles, that if this opinion were correct later deformities of the bones would

appear, and could hardly be overlooked. Reliquet [24 May 20,'94] mentions a case of senile osteomalacia of the coccyx, sacrum, and vertebral column.

Osteomyelitis.—Canon [4 Feb.12,'94] has made some interesting investigations, based on the bacteriological examination of freshly-drawn blood, as to the causes of sepsis, pyæmia, and osteomyelitis. He divides his cases into three groups: (1) pure sepsis, in which bacteria appear in the blood and no metastases are present; (2) cases in which there are bacteria in the blood, and also metastases; (3) pure pyæmia, in which are present many metastases, but no bacteria in the blood. Thirty-six cases of the first group were examined. In all the patients died within ten days. The second group comprised 20 cases, including 6 of osteomyelitis. In the third group 20 cases were examined, of which 4 died and 3 recovered. These three forms differ from each other not in the character of the bacteria which cause them, but in the nature of their invasion of the body, the difference depending upon a variety of causes relating to the bacterium and to the individual. The practical worth of these observations, except, perhaps, for purposes of prognosis, is not great.

Max Wolff [4 May 28,'94] makes some interesting remarks on acute osteomyelitis. It was formerly found necessary, in order to produce an osteomyelitis after injecting the staphylococcus pyogenes aureus into the circulation, to bruise or fracture a bone. The experiments of Rodet and of Lexer, however, have demonstrated that a trauma is unnecessary when young animals and sufficiently virulent cultures are employed. The same may be said of ulcerative endocarditis, which in its causation is so closely allied to osteomyelitis. He maintains that, although the staphylococcus may not be the only source of the bone-lesion, it is at least the principal one. Although some focus as a source of infection can often be found, there are many cases in the young where no such focus exists. Wolff suggests that these latter may be due to fœtal infection from the mother, certain observations and investigations leading him to this view.

Mueller [34 Nos.47,48,'93; 2 Jan.6,'94] believes that the relapsing form of osteomyelitis is due to the staphylococcus remaining latent in the tissues, to be later on stimulated into renewed activity. The forms of osteomyelitis due to the acute infectious diseases make a group by

themselves, as they attack only the periosteum, or at most a thin layer of the surface of the bone. They are not due to mixed infection, but to pure cultures of the germs causing the infectious disease. All cases of true osteomyelitis, however, are due to the staphylococcus alone, which is carried by the blood from the point of entrance, perhaps an insignificant wound or abrasion, to the cancellous structure of the bones.

Oscar Bloch [996 May 25,'94] investigated, bacteriologically, 10 cases of abscess of bone, in 3 of which the staphylococcus pyogenes aureus was encountered; in 4, the staphylococcus pyogenes albus; in 2, the color of the cultures was midway between yellow and white; in 1 the color was not mentioned.

The treatment of septic osteitis in childhood is discussed in a particularly clear manner by Edmund Owen, of London. [6 May 26,'94] He says: "Recognizing the desperate nature of these cases, their treatment must needs be prompt and energetic. With swelling and tenderness at the end of a dyaphysis, together with a high temperature and other signs of constitutional disturbance, the surgeon should cut down upon the affected tissue. He should by no means wait for fluctuation or for other obvious signs of suppuration, as no pus may be present. Parents seem imbued with the idea that no tender swelling should be 'lanced' unless there is ample evidence of 'matter' beneath, and I have known members of our own profession to share that notion. In a case of this sort it would be difficult to find a line of procedure more fraught with danger. Delay allows the septic inflammation to make irremediable havoc; therefore, the sooner the area of disease is attacked and cleared out, the better. To wait for fluctuation is to give the staphylococci and other micro-organisms the full opportunity of doing their worst. An incision should be made down through the periosteum, and, if pus by chance be found beneath it, the abscess-cavity should be thoroughly washed and swabbed out with a solution of chloride of zinc (20 grains to 1 ounce—1.33 grammes to 31 grammes). Further, search should be made for the line of the junction-cartilage, and, if an opening be found in it, it should be enlarged and the interior scraped and washed. If no pus be found beneath the periosteum the diaphysis should be trephined in several places, the intervening pieces of bone being cut away, the suppurating marrow scraped out, and the cavity swabbed with the

zinc solution. It is impossible to be too thorough in these procedures; sometimes after the operation nothing is left of the diaphysis but the thin shell of its compact tissue. The cavity should then be filled with gauze, and the wound dressed with wood-wool tissue, the limb being secured upon a splint. Quinine, iron, and morphia are likely to be the only drugs needed." The portion of the article relating to diagnosis is also well worth reading. In differentiating para-epiphysitis from acute rheumatism, he emphasizes the value of the negative results obtained by the administration of salicylic acid. Even the fact that two or more parts of the body may be affected simultaneously should not exclude the possibility of osteitis.

In an article on early operation in osteomyelitis, E. Küster defines $\frac{336}{\text{July 28,'94}}$ the disease as including all forms of microbic inflammation of bone, without regard to the part of the bone affected or the species of infecting germ. Names such as *periostitis albuminosa* should be replaced by *osteomyelitis albuminosa*. It is possible for the micro-organisms to enter through the uninjured skin, but a furuncle or a carbuncle generally forms an intermediate stage before osteomyelitis results. Abrasions of the skin, such as result from scratching in certain diseases, may serve as points of direct inoculation, especially in those with uncleanly skins. This author also $\frac{41}{\text{May 3,'94}}$ makes a strong plea for early operation in cases of acute osteomyelitis; not only because the life of the patient is thus often saved, but because rapid healing is promoted and extensive destruction prevented. In this he was supported by various members of the Kongress der Deutschen Gessellschaft für Chirurgie, including Karewski, of Berlin; Körte, of Berlin; Schede, of Hamburg; Nasse, of Berlin; Heidenhain (who claims merely that healing takes place more rapidly following early operations); and Tscherning, of Copenhagen. Lindner, of Berlin, on the other hand, regarded an osteomyelitis as the local manifestation of a general sepsis, and was skeptical as to the benefits of an early operation. Sonnenburg, of Berlin, also regarded the disease as a species of sepsis, which might be caused by any of the septic micro-organisms. Gussenbauer, of Prague, also spoke doubtfully of the benefits of an early operation. The weight of evidence was, however, in favor of early and extensive chiseling away of bone and scraping away of all infected material. In

discussing the treatment of osteomyelitis, A. Broca [55 Feb.3,'94] insists, in the acute form, on an early and thorough operation,—one in which the bone is trephined and the medulla removed as completely as possible.

T. Colcott Fox, of London, [60 Aug.9,'94] reports a case of osteomyelitis with erythema multiforme,—a rare complication. Two cases of primary osteomyelitis of the vertebræ are reported by Morian, of Essen. [13 Apr.,'94] The affection is a very rare one in this situation.

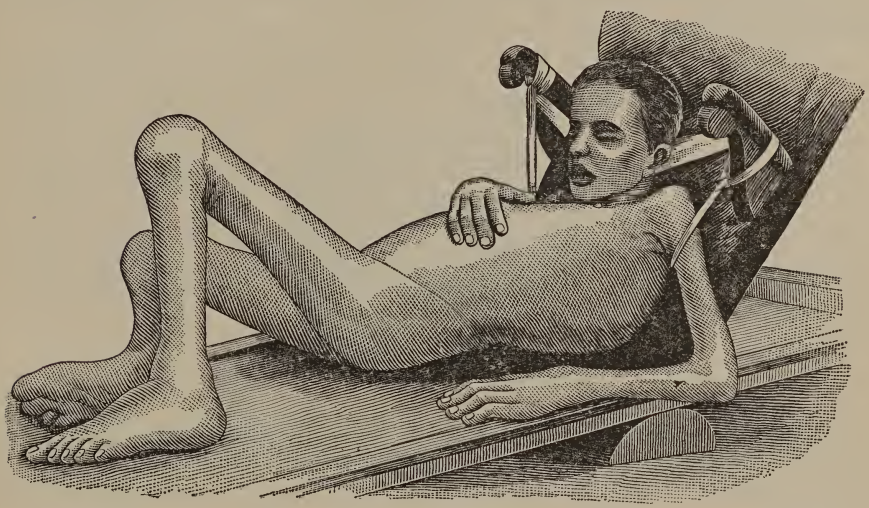
Fragilitas Ossium. (W. Blanchard.)
American Medico-Surgical Bulletin.

A. von Bergmann, of Riga, [336 July 28,'94] in an article on resection of the os ilium for acute osteomyelitis, gives, as indication for the operation, diffuse softening of the spongy portion, especially when numerous miliary abscesses are present and the periosteum is extensively loosened. Out of 35 cases which he has collected, only 11 were cured, 13 died, and the results in 6 cases were not reported.

Oscar Bloch [91 July 10,'94] maintains that the "neuralgic osteitis of

Gosselin is merely a particular form of infectious osteomyelitis, in which, although no suppuration is present, the staphylococcus pyogenes aureus may be found if properly searched for. A thorough *résumé* of the subject of acute osteomyelitis is made by Kurt Müller. [34 Nov.21,'93]

Fragilitas Ossium.—Jarvis S. Wright, of Brooklyn, [157 Dec.,'93] describes a case of fragilitas ossium, in a boy of 18 years, in which marked deformities of the extremities were corrected by osteotomy, union after the operation taking place quite readily and satisfactorily. Wallace Blanchard [814 Nov.,'93] reports a case of fragilitas ossium in which over one hundred fractures had occurred. The



HYPERTROPHIC PULMONARY OSTEO-ARTHROPATHY. (SPRINGTHORPE.)
Australian Medical Journal.

patient is now 27 years of age. (See illustration on preceding page.) Union of the fractures took place slowly and imperfectly.

Hypertrophic Pulmonary Osteo-arthropathy.—J. W. Springthorpe, of Melbourne, [285 May 15,'94] submits the report of a case of hypertrophic pulmonary osteo-arthropathy, which is the first example of this affection observed in Australia. There were present (see illustration) the ordinary features of such a case,—the dorsal curvature of the spine, dry and roughened skin, enlargement of the hands and feet, etc.,—while the face remained free from any marked changes. Jamet, of Paris, in a thesis on the subject, [126 Jan.15,'94] maintains that pulmonary hypertrophic osteo-arthropathy is just as

frequent among children as among adults. A. Demonds and W. Binaud, of Bordeaux, [360 Aug.,'94] claim to have produced marked improvement, even to the arresting of the disease, in a case of hypertrophic pulmonary osteo-arthropathy, by means of hypodermatic injections of a liquid prepared from the lungs of sheep. In all, sixty injections were employed. A case of the affection in question is also reported by James Kerr. [2 Dec.2,'93]

Actinomycosis.—The subject of actinomycosis of bones is considered by Guermonprez and Becue, [220 Mar.31,'94] who maintain that primary osseous actinomycosis is yet to be demonstrated. The disease begins always in the soft parts, in the neighborhood of the digestive or respiratory tract, and invades secondarily the bones near these parts.

Neuralgia.—Remy and Sapelier [67 Apr.30,'94] discuss the treatment of bone neuralgias, concluding as follows: 1. Intense and obstinate pain in the shaft of a bone, even without definite signs of an osseous lesion, should lead the physician to suspect osteo-neuralgia. 2. When such pain exists, if there is a history of a contusion, even if there are no signs of an osseous lesion, the surgeon should open the bone extensively and curette the interior. Mere trephining is not sufficient. Several cases are cited.

DISEASES OF THE JOINTS.

Foreign Bodies.—D. S. Fairchild, of Clinton, Ia., [106 Jan.,'94] removed a minie-ball from the knee-joint twenty-nine years after the injury was received. Ten hundred and forty-seven loose bodies were removed from a single knee-joint of a man of 22 years by James Berry. [2 May 19,'94] W. Arbuthnot Lane [2 Dec.2,'93] reports a case in which detached pieces of articular cartilage formed loose bodies in both knee-joints. He maintains that a considerable proportion of these bodies are due to trauma, although the time and nature of the injury may have been forgotten by the patient. In reporting before the London Clinical Society a case of excision of part of a dislocated semilunar fibro-cartilage of the knee, Lockwood [2 Mar.17,'94] considered that, "as asepsis was easy in the case of the knee, the operation was attended with small risk and little anxiety." Allingham said that he had opened the knee-joint thirty-four times, and only once had anything gone wrong, when stiffness resulted. Moullin said that in two cases in which he had sutured the car-

tilage to the tibia the symptoms had recurred after three and six months. In five cases he had removed the cartilage and the patients had all recovered. A large calcareous body was removed from the bursa over the patella by A. M. Buchanan, of Glasgow. $^{277}_{\text{July,'94}}$ (See illustration.) Real $^{13}_{\text{Sept.15,'94}}$ discusses the subject of foreign bodies in the joints and reports nine cases.

Metatarsalgia.—V. P. Gibney $^{242}_{\text{Sept.,'94}}$ recommends, for cases of metatarsalgia, a shoe made on a "Spanish last," which raises the arch of the foot and makes considerable pressure in this region. It should be provided with a modified French heel, and be laced rather tightly across the instep, leaving the ball of the foot free. The subject is also considered by Bose $^{360}_{\text{July,'94}}$ and J E. Goldthwaite. $^{99}_{\text{Sept.6,'94}}$

Syphilis.—In discussing a paper by Bowlby, $^{2}_{\text{Oct.28,'93}}$ on a case of

Calcareous Body Removed from the Bursa over the Patella. (Buchanan.)
Journal of Anatomy and Physiology.

multiple syphilitic disease of the joints, Jonathan Hutchinson, Jr., emphasized the point that it could not be said that because a joint affection did not yield to specific treatment it necessarily could not be syphilis. He doubted that there was much difference between the joint-lesions of congenital and acquired syphilis; but the symmetrical synovitis of the knees, occurring about puberty, was perhaps peculiar to the congenital form. These cases of symmetrical synovitis, closely following interstitial keratitis, fortunately clear up rapidly under treatment.

Osteo-arthritis.—L. Dor $^{55}_{\text{Nov.25,'93}}$ has not only succeeded in finding a definite micro-organism in arthritis deformans, but has reproduced the disease by injecting cultures directly into the blood of rabbits. He considers the germ an "attenuated culture" of the

staphylococcus pyogenes aureus. It is found, as is the micro-organism of acute rheumatism, in the granulations, etc., about the joint, but not in the joint-fluid itself.

H. Lloyd-Davies, of Buxton, Eng., [6 Oct.14,'93] describes a case of polyarticular rheumatoid arthritis in a child 6 years old. Out of 307 cases treated in the Devonshire Hospital during 1892, only 2 per cent. contracted the disease before the age of 10. In one child of 10 the affection was said to have begun at the age of 2.

Newton Pitts [2 Dec.16,'93] describes four cases of osteo-arthritis with fibroid subcutaneous nodules. The diagnosis of rheumatic non-tubercular arthritis of the spine, a somewhat rare affection as compared with the tubercular form, is considered by Broca. [14 May.27,'94] It has a tendency to appear in the lateral articulations of the cervical region, producing torticollis and pain in the region of the corresponding ear. No doubt, as Lannelongue has emphasized, many cases of so-called torticollis are really cases of vertebral rheumatism; hence the region of the cervical vertebræ should always be carefully palpated.

John Kent Spender [2 Apr.28,'94] attempts to prove "that the phenomena of muscular atrophy in rheumatoid arthritis are myelopathic and capable of definition as a strict spinal paralysis." Three cases are given. Polaillon [55 Novl8.,'93] reports 83 cases of "dry arthritis," comprising chronic rheumatism, gout, and trophic lesions arising during tabes dorsalis. A. C. Crocket, of Fredericton, N. B., [284 Dec.,'93] gives an excellent description of rheumatoid arthritis.

Gonorrhœal Arthritis.—A comprehensive article on gonorrhœal arthritis, with notes of cases, is contributed by Thomas H. Manley, of New York. [5 July,'94] In an extensive article on blennorrhagic arthritis, Ch. Lasalle [31 July 25,'94] strongly advocates arthrotomy in all forms of the disease except the purely neuralgic. The method is especially applicable in grave cases where there is much pain and danger of ankylosis. The pain disappears rapidly, the temperature soon falls, and ankylosis may often be prevented.

Joseph Griffiths, of Cambridge, and R. A. Milligan, of Northampton, [2 May 5,'94] report a case of ossification of the left knee-joint in a young man. The affection is very rare, if not heretofore altogether unknown. A case of primary sarcomatous degeneration of the synovial membrane of the knee-joint is reported, [6 June 30,'94] with

the comment that this condition is "practically unknown." A. Logan Turner, $^{6}_{\text{July 7,'94}}$ however, describes a similar case.

An interesting paper, by Herbert L. Burrell, $^{99}_{\text{Oct.12,'93}}$ treats of gunshot wounds of the joints as related to the new, small-calibre, hard-jacketed bullets now coming into such extensive use in various countries, including the United States. The new rifle has a calibre of only .30. Its projectile has an initial velocity of 2000 f. s. and weighs 220 grains (14.2 grammes). It is made of a jacket of German-silver filled with lead, and is neither grooved nor lubricated. It is impressed by 36 grains (2.3 grammes) of smokeless powder. The initial and striking velocities of this bullet are much greater than those of the old .45-calibre Springfield rifles. The concussion is much less than that of the old one, while the penetration has been augmented five or six times. This results in the track of the projectile being much more cylindrical, with less contusion of tissues. At short range these new bullets have an explosive action, but at long range they do much less damage to bones and soft parts than the old bullets, the bones being merely perforated and but little splintered. The author concludes: "1. That joints having large synovial cavities will have to be thoroughly explored and cleansed, except possibly where the injury has been received at mid- and long range. 2. That small or superficial joints, with small synovial areas, will simply require cleansing and tamponading. 3. That it will require a larger number of company-bearers, Red-Cross workers, and surgeons than have ever heretofore been assigned for duty. 4. That so far as joint injuries are concerned, the new .30-calibre is more humane than the .45-calibre bullet."

An instructive clinical lecture, delivered by Alfred Willett, of London, $^{1077}_{\text{May 30,'94}}$ deals with a new hot-air treatment of stiff and sprained joints, etc. The limb with the affected joint is placed in an appropriate box and the temperature gradually and yet rapidly raised from 240° F. (115.5° C.) to 280° F. (137.7° C.), and even, in some cases, to 300° F. (148.8° C.). This temperature is maintained from half an hour to an hour. The treatment is not uncomfortable, although the skin becomes very red and moist, showing great increase in the circulation. The results, according to Willett, are very satisfactory, some of them being almost marvelous. A man so affected with synovitis of the knee

that he could scarcely hobble by the aid of two canes was enabled to walk almost briskly at the end of thirty minutes. A woman with flexed and stiffened fingers from chronic gout was enabled to use them freely and without pain at the end of half an hour. Other cases were reported, flat-foot and gonorrhœal rheumatism being among them. Whether or not the enthusiasm of Willett is well grounded must be determined by further trial of the method.

Some very interesting points on the diagnosis of joint-lesions accompanying tabes dorsalis are given by W. B. Noyes, of New York. 59 June 16,'94 The subject of diseases of joints is well discussed by Cheever, of Harvard University. 99 Dec.28,'93

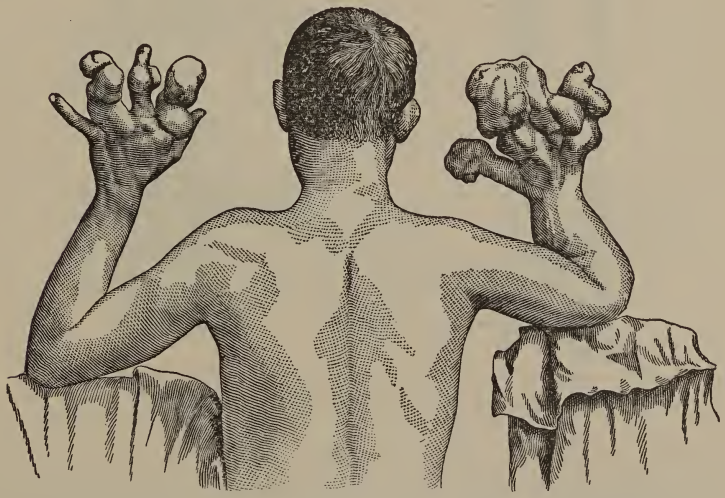
Bone-Growth.—Robert A. Reid, of Newton, Mass., 547 Nov.,'93 makes the interesting statement that the nails cease their growth as soon as one of the long bones of an extremity is broken. When the nails begin to grow again it is an indication that union of the fracture is going on satisfactorily.

From the results of sixty-five experiments, Barth, of Marburg, 41 May 24,'94 has arrived at the conclusion that transplanted sections of bone, whether from the same or a different individual, never retain their vitality under any circumstances; that by the end of the first week the bone-cells are all dead, and the fragment becomes merely an aseptic foreign body. This soon becomes surrounded by fibrous tissue, new bone forms around it and throughout its substance, while the old bone is gradually absorbed. Even the retention of the periosteum covering the fragment has no effect in preserving its vitality. These opinions are in direct opposition to those of Ollier, who believes that fragments of bone, when obtained from the same individual in whom they are transplanted, or even from the same species, are capable of preserving their vitality. Helferich, of Greifswald, 22 May 30,'94 has demonstrated that the intermediate cartilages of the long bones of rabbits may be removed and then replaced without interfering with the continued growth of the bones. An article on the effects of lesions of the epiphyseal cartilages on the growth of bones is contributed by G. Nove-Josserand, of Lyons. 91 May 10,'94 Ollier, of Lyons, 996 July 10,'94 has written a work dealing with subperiosteal resection and the regeneration of bone. As is well known, he is a thorough believer in the power of the periosteum to regenerate bone under favorable circumstances, and is a firm advocate of subperiosteal operations.

A case of "osteo-ecchondroma" is described by James T. Whittaker, of Cincinnati. [451 Feb.,'94] (See illustrations.)

MULTIPLE OSTEO-ECCHONDROMA. ANTERIOR VIEW. (JAMES T. WHITTAKER.)

P. B. Bennie [51 May,'94] considers that all so-called growing-pains are caused by either "neuralgia from the fatigue of overexertion,



THE SAME CASE. POSTERIOR VIEW. (JAMES T. WHITTAKER.)
International Medical Magazine.

rheumatism, diseases of the joints, diseases of the bones, fevers, or adenitis." Calot, of Berck, [853 July 1,'94] resected, for tubercular disease,

the upper half of the femur subperiosteally in a child of 12 years. Two years after the operation he found that the bone had been almost completely regenerated, and a new and nearly perfect joint formed.

S. H. Pinkerton, of Salt Lake City, $\frac{2044}{'93}$ describes a sarcoma of the fibula (see illustrations) which remained quiescent for nearly twenty years and then grew rapidly, requiring disarticulation at the knee.

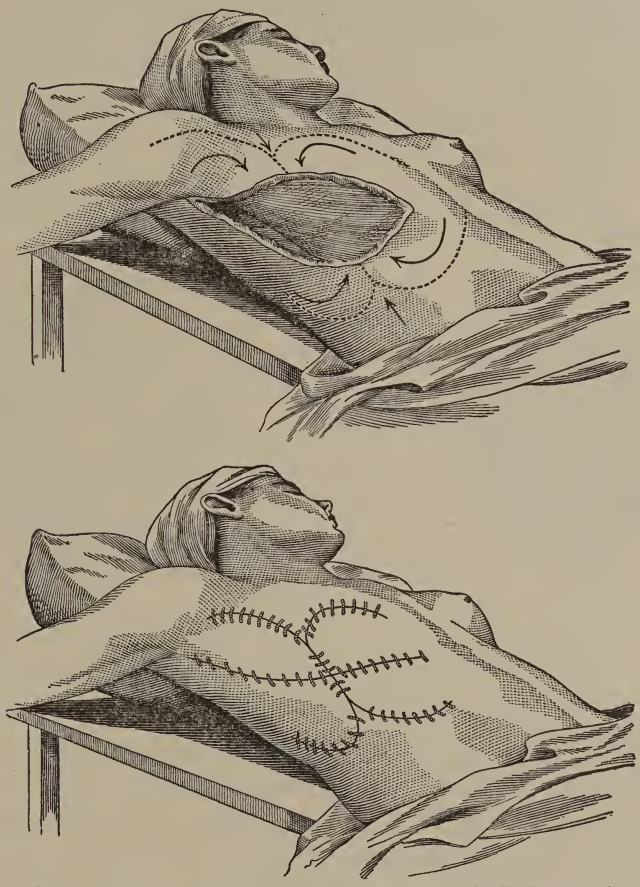
Anterior. Posterior.

SARCOMA OF THE FIBULA. (S. H. PINKERTON.)

PLASTIC SURGERY.

Skin-grafting.—Geo. F. Shrady, of New York, $\frac{59}{\text{Dec.2,'93}}$ describes a simple method of closing large operation wounds by sliding skin-flaps as follows: "A straight incision is made at right angles to the short axis of the ellipse (supposing the wound to be of that form), and at a suitable distance is terminated by two sweeping,

well-rounded curves which diverge in opposite directions, resembling in contour the outlines of the buttocks. The same flaps may be made, if necessary, in a reverse direction on the corresponding opposite side of the gap. When these flaps are loosened from their bases throughout their whole extent, their free edges easily slide toward each other along the lines of the curves and are brought



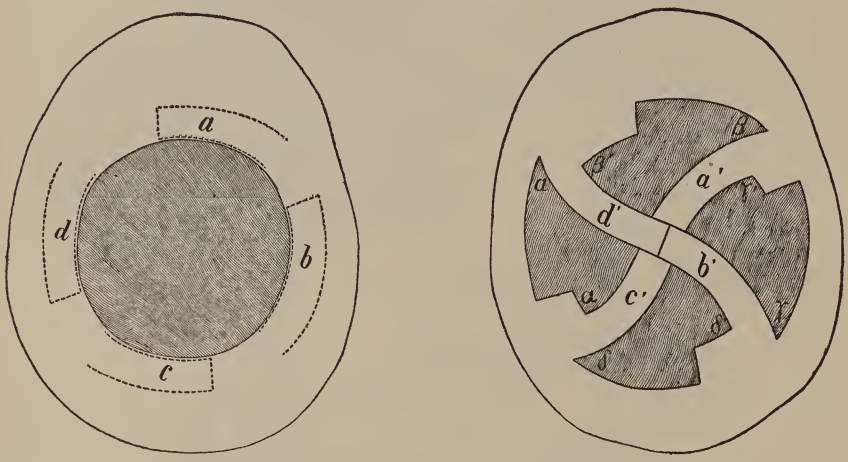
Closing Wounds by Sliding Skin-Flaps. (G. F. Shrady.)
Medical Record.

together with sutures, thus closing the entire wound by converting the long axis of the ellipse into a straight line." (See illustrations.)

Julius Schnitzler and Karl Ewald, of Albert's Clinic in Vienna, $\frac{336}{\text{Feb.17,'94}}$ have been making Thiersch transplantations directly on to granulating areas without a preliminary freshening of the surface in any way. They claim to have obtained just as good and

reliable results as by the original method of Thiersch. In cutting the grafts the skin may be first frozen with ethyl-chloride spray; so that a general anæsthetic is not necessary. [I have tried this method with success.—L. F.] A certain amount of suppuration, even at the time of the operation, does not always prevent a good result. E. Goldman, [761 B.11; 336 Feb.17,'94] O. J. Mayer, of San Francisco, and Helferich [69 Jan.4,'94] have also written on Thiersch grafting.

A plastic operation, originating with Volkmann, by means of which large defects in the scalp may be diminished in size, and their healing considerably promoted, is recommended by Messner, of Munich. [336 Aug.11,'94] Four tongue-shaped flaps are cut from the



Skin-grafting on Scalp. (Messner.)
Centralblatt für Chirurgie.

circumference of the defect and turned in toward its centre, where they are united by sutures. (See illustrations.) The remaining raw surfaces may be filled in by Thiersch grafts. The subsequent growth of hair will often cover all cicatrices.

O. Guelliot [577 Dec.,'93] writes exclusively on the modified Italian method of skin-grafting (*greffe par approche*), and reports a number of interesting and successful cases. In this method the graft is obtained from some portion of the body which can be brought into contact with the surface to be covered in, the graft remaining attached by a pedicle until union takes place. (See illustration.)

O. Rieguer [336 Dec.16,'93] replaced the entire scalp, which had been torn away, by Thiersch grafts.

Bone.—Th. Glück, [158 B.16,H.6] in an extensive article on the subject, makes a strong plea in favor of repairing defects in bones with various foreign bodies. He still maintains that not only large pieces of bone may be replaced, but that serviceable joints may be manufactured from ivory, celluloid, or other suitable materials, and made to heal into the tissues in place of the natural articulations. The history of the subject is carefully reviewed, and numerous cases are cited in proof of his theories. He also considers the replacement of sections of tendons and nerves, not only by similar tissues from animals, but by various organic and inorganic substances, and mentions numbers of successful cases. The features of success in the repair of osseous defects by inorganic materials lie mainly in perfect asepsis, adequate fixation, and appropriateness of form. In an article on the reparation of osseous structures by prothetic appliances, Péan [100 Mar.15,'94] concludes that it is possible to replace important portions of the skeleton, even a joint. The apparatus, however, must not only be aseptic, but must be constructed of some non-absorbable substance. A. Caselli, of Genoa, highly recommends, [4 Apr.2,'94] from his personal experience, the sunken bone-suture with silver wire, as it is very seldom that the suture requires subsequent removal. A congenital defect of the radius was remedied by Bardenheuer, of Cologne, [22 May 3,'94] by splitting the ulna longitudinally and adjusting one of the halves so as to form a new radius. H. Hinterstoisser, of Teschen, and R. von Frey, of Gratz, [116 May,'94] report successful cases of replacement of defects of the skull and other parts of the body by means of celluloid plates. Bramann, of Halle, [22 May 30,'94] replaced a badly-comminuted portion of the humerus with a section of bone taken from the tibia. Union fortunately followed, the arm thus being saved from amputation.

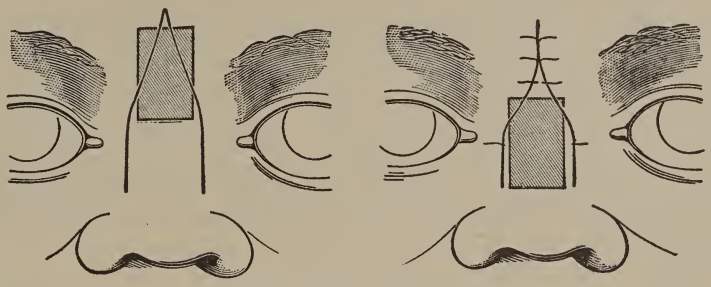
GREFFE PAR APPROCHE. (GUELLIOT.)
L'Union Méd. du Nord-Est.

In some remarks on the effects of foreign bodies remaining in the tissues, Thiéry [7 No.18,'94] divides such bodies into two kinds,—septic and aseptic. The latter produce no symptoms whatever, unless they be of a sufficiently irritating nature to cause sclerosis. The former may cause either active suppuration, with perhaps a remaining fistulous tract; or they may produce only sufficient irritation to cause the formation of an irritable connective-tissue tumor. Lick [69 May 17,'94] reports a case in which a cavity in the tibia of a patient, remaining after the removal of an osteomyelitic focus, was successfully filled with plaster of Paris. In the ANNUAL of last year was noticed a series of experiments, by Dreesmann and O. J. Mayer, in filling bone-cavities with various substances as one fills teeth. Dreesmann employed plaster of Paris, while Mayer used an amalgam of copper. The results were encouraging. E. Martin, of Köln, has made further successful experiments in this line, using plaster of Paris and "base-plate gutta-percha," a reddish material much used by dentists, which can be softened in hot water, and thus at the same time sterilized.

Rhinoplasty.—Julius Wolff, of Berlin, [4 Feb.5,'94] has written an interesting series of articles on osteoplastic operations by means of sliding flaps of bone. He states that pieces of bone, when severed completely from their surroundings and replaced in the same or another locality, may undoubtedly retain their vitality, instead of undergoing absorption, as has been claimed, although such a result does not always take place and cannot be relied upon. Reformation of bone from flaps of periosteum (Ollier) is also uncertain. The skin-periosteum-bone flaps of König inaugurated a new era in osteoplastic surgery. Wolff has modified König's method in that he utilizes the loose interstitial tissue binding the bone to the skin, in order to *slide* the bone-flap to its new position without cutting a true skin-flap, as did König. In correcting the deformity known as "saddle-nose," due to the loss of the bony frame-work of the organ, he has obtained some excellent results by sliding a chiseling of bone down from the forehead between the eyebrows. (See illustrations.) The nose is divided horizontally near its centre, leaving a pointed flap attached to the tip and reaching up on to the forehead. The chip of bone, which, of course, remains attached to this "tongue," is slid into place while the end of the nose is strongly depressed, the skin-flap being sutured on all sides

in its new position. If the flap should be slid so far that it wrinkles at its base, the fold may be subsequently removed. The author shows that pseudarthroses may be healed by similar skin-periosteum-bone flaps, and he has successfully operated upon a subluxation of the sternal end of the clavicle. He has also successfully employed a similar proceeding in the cure of inguinal hernia, by sliding a bone-flap from the pubis over the opening of the inguinal canal and suturing it in position with catgut. [I have employed Wolff's method in a case of saddle-nose with fairly-satisfactory result.—L. F.]

S. K. Ellison, of Australia, [6 Feb.17,'94] reports a successful case in which he replaced the bridge of a depressed nose by a perforated gold plate between the skin and deeper tissues. He attributes the frequent failures of previous efforts in this line to the fact that



OSTEOPLASTY. (WOLFF.)
Berliner klinische Wochenschrift.

the plates employed are not perforated. Chauvel [10 July 24,'94] speaks well of the future of the method of rhinoplasty in which a plate of platinum or other foreign substance is used as a means of support for the new nose. He has collected fourteen cases in which gangrene or suppuration occurred but three times, and then the trouble was not due directly to the presence of the supporting plates. The results were quite satisfactory from an æsthetic point of view, which cannot be said of the older methods of total rhinoplasty. Paul Berger, however, does not consider the results superior to those of other procedures, and advises an inspection of cases several years after the operation before advancing a definite opinion. Küster, of Marburg, [336 July 28,'94] deprecates the tendency of modern surgeons to discard the old method of rhinoplasty from the arm, stating that the operation fell into disuse because of attempts to

make it answer for total rhinoplasty; while it is only fitted for replacing the tip of the nose, or for obtaining a lining for a flap from the forehead. For these two purposes he strongly recommends it, reporting a successful case.

Tenorrhaphy.—In discussing the subject of tenorrhaphy, F. B. Lund, of Boston, $^{1}_{\text{Oct. 7, '93}}$ emphasizes the necessity of restoring the length of a divided tendon, as well as its continuity; if a flexor of a finger, for instance, should be left too short, it would always be impossible to fully extend the finger. The different methods of suture and of filling in defects are considered at length. The author speaks well of transplantation of tendon from an animal to man, and of suturing the distal end of a divided tendon to an adjacent tendon. Healing by first intention is considered to be of primary importance, although union may take place without it. Fifteen cases are reported, eleven of which were more or less successful. Félizet $^{14}_{\text{Nov. 19, '93}}$ recommends a simple method of recovering the retracted proximal ends of divided flexor tendons of the fingers. The finger belonging to the injured tendon is strongly flexed, while the adjacent fingers are extended. The pulling down of the uninjured tendons thus exerts a certain amount of traction upon the lost end, which often brings it into sight without difficulty.

FRACTURES AND DISLOCATIONS.

By LEWIS A. STIMSON, M.D.,
NEW YORK.

FRACTURES.

Massage.—The value of massage as an adjuvant in the treatment of fractures is the subject of papers by Bauby and Bardier, [1088 Oct.8,'93] Serenin, [852 B.3,H.4; 21 Dec.23,'93] Prawdoljubow, [859 No.46; 21 Feb.10,'94] and Michon. [55 Mar.10,'94] Most of them show a wholesome tendency to avoid the exaggerations that have marked the claims of previous advocates of the method, and to distinguish the class of cases in which it may be used with advantage in combination with or without splints. Bauby and Bardier speak only of its use in fractures of the lower end of the radius and of the malleoli, and to these Michon adds fractures of the ulna, radius, and fibula alone and of the outer end of the clavicle. It appears to be satisfactorily established that in suitable cases massage promotes comfort and at least expedites the restoration of function. The suitable cases are those in which there is little or no tendency to displacement of the fragments, those in which the skin is uninjured, and those in which the broken bone is not too thickly covered with muscles; such conditions are found especially at the wrist and elbow, in fractures of the fibula or external malleolus alone, but certainly not in the more extensive and common injury at the ankle, in which the external malleolus is separated from the tibia and causes the foot to drop backward and outward (Pott's fracture).

Fractures of the Thigh and Leg without Confinement to Bed (Ambulatory Treatment).—This method has received much attention, especially in Germany, during the last two or three years. Numerous articles have been written upon it, and the statistics of several surgeons have been published, among them those of Schmid, [336 No.32] Bruns, [761 V.10] Dollinger, [336 Jan.6,'94] Lierman, [336 Feb.24,'94] Korsch, [116 July,'94] Garré, [4 May 21,'94] Kiliani, [150 June 15,'94] and Bardeleben, Korsch, Albers, and Krause at the meeting of the German Surgical Society in April. [336 No.30,'94]

The dressings used for fractures of the leg are usually of plaster of Paris with included wooden or metal strips and a very thick plaster sole separated from the foot by a layer of cotton about five centimetres thick, the plaster being applied directly upon the skin or over a thin layer of cotton, and carefully molded with the hands so as to fit snugly against the upper end of the tibia, about the ankle and dorsum of the foot. Care must be taken to have the foot at right angles with the leg. It is generally thought best not to apply the dressing until the second or third day after the accident, and to renew it once or twice at intervals of a week. The patient must also remain under observation in order to detect and remedy any displacement or undue constriction. In fractures of the thigh the dressings recommended by some are of plaster of Paris or of a combination of plaster and glue, while others have used special splints somewhat like those employed in disease of the hip-joint. The plaster dressings always include the pelvis and sometimes are carried as high as the nipple. The dressing is first applied to the leg and allowed to harden; then the patient's hips are raised from the bed, traction made to correct displacement, and the remainder of the dressing applied; an important feature of the dressing is its strong re-inforcement, close application at the upper and back part of the thigh securing a firm bearing against the ischium.

Albers uses for this purpose an eight-fold pad of plaster-soaked gauze, eighty centimetres long and twenty centimetres wide, which is placed with the middle of its upper border against the tuberosity of the ischium, one-half being brought around the inside and front of the thigh, the other around the outer side of the thigh and pelvis to the umbilicus. It has been used successfully in fractures of the shaft and of the neck of the femur. The advantages claimed by Bardeleben for the method are that it greatly reduces the danger to life arising from confinement to bed either through pneumonia or delirium tremens, that it prevents muscular atrophy, and that it somewhat shortens the time required for consolidation. The claim made by some that patients thus dressed can immediately walk without the aid of crutches or canes is not advanced by all. Most of them say that crutches are needed for a week or two, and, as in fractures of the leg, a thick sole is needed on the sound limb to compensate for the additional length

given by the thick sole on the projecting splint on the other. It may well be doubted if the patient could be safely left to his own unaided means of progression.

Compound Fractures.—Mumford, [99 May 10,'94] in a very interesting and thoughtful article, gives the results of treatment of 300 cases of compound fracture in the Massachusetts General Hospital during the last eight years. He excludes from the list those cases which terminated fatally within the first twelve hours and those treated by primary amputation. Of the 300 cases 30 died,—a mortality of 10 per cent.; the causes of death were sepsis 10, shock 7, delirium tremens 6, fat embolism 3, gangrene 3, acute nephritis 1. In 171 cases the fracture was of one or both bones of the leg, with 18 deaths,—a little more than 10 per cent.; the highest mortality was in fractures of the femur, 25 cases with 7 deaths, —28 per cent. In 50 cases involving joints there were only 3 deaths,—one each at the knee, ankle, and wrist. In 20 cases secondary amputation was performed. Primary wiring of the fragments was done in 27 cases, and in 7 of them necrosis followed.

The special feature of the treatment is the infrequent use of counter-openings and drainage; in an earlier antiseptic period in the same hospital much freer use of drainage was deemed necessary, and Mumford thinks that the possibility of safely dispensing with it in these later years has been reached through the gradual purification of the hospital itself, by which the chance of infection has been reduced.

Vertebræ.—Moritz [21 June 2,'94] reports two cases of fracture of a spinous process by muscular action. In one the spinous process of a lumbar vertebra was broken in an effort to lift a heavy weight; inflammatory symptoms set in and the patient soon died. The autopsy showed an abscess deeply situated in the lumbar region, and in it the broken process. In the second case, in which the spinous process of the sixth cervical vertebra was broken in an effort made in shoveling snow, recovery ensued. Rebustello [589 Apr.10,'94] reports a third instance. Cases of operative interference after fracture (laminectomy) have been reported by Riggs and Pyle, [96 June,'94] two each; Wyeth [96 Aug.,'94] three cases, and Welford [39 Aug.,'94] two cases. Improvement followed the operation in one of Wyeth's cases, in one of Pyle's (a gunshot wound of the spine), and in one of Welford's. In the discussion which followed the reading of Wyeth's paper,

before the New York Surgical Society, several cases of operation without benefit were reported, and all the speakers were opposed to the operation. Pyle adds to his own cases fifty-two instances of laminectomy, for various lesions, collected from published reports in 1891, '92, and '93; "recovery with improvement" noted in fifteen. Thorburn $\frac{6}{\text{Aug.11,'94}}$ condemns the operation except in certain selected cases. Save in certain conditions, he does not believe that laminectomy is likely to be of any service in injuries of the spine and spinal cord. The commoner cases, in which the crush is followed by recoil, clearly do not call for laminectomy; these cases generally die, or at least no recovery of the cord takes place; such evidence as we possess indicates that the human cord is incapable of repair after crushing. He has not found, either in published records of some two hundred cases or in personal experience of seven, any clear evidence of benefit from the operation. Nevertheless, laminectomy may be employed, according to him, "(1) in compound fractures; (2) in injuries of the laminæ and spinous processes, with lesion of the cord where the crush is probably incomplete; (3) when the symptoms are mainly or entirely due to thecal or perithecal hæmorrhage; (4) in pachymeningitis or peripachymeningitis, which may follow an injury after a very long period; and (5) in cases of compression of the cauda equina."

Ribs.—Cases of fracture of the ribs by muscular action are reported by Scherck, $\frac{1}{\text{Apr.7,'94}}$ Weston, $\frac{239}{\text{May 1,'94}}$ and Ahern. $\frac{1}{\text{Apr.21,'94}}$ The first was of the ninth rib, in a man of 72 years, by coughing; the second was of the seventh and eighth ribs, in a man of 53 years, by the effort made to spring out of bed in a fright. Ahern reports two cases caused by coughing.

Detachment of the Anterior Inferior Spinous Process of the Ilium by Muscular Action.—Whitelocke $\frac{6}{\text{Nov.25,'93}}$ reports two cases of this injury in young men aged 18 and 19, respectively; in each it occurred during a foot-race,—in one at the start, in the other after having run about ten yards. The symptoms were a sense of powerlessness and a slight pain at the corresponding region, increased by any attempt to extend the knee or hip, and, in one case, an unpleasant feeling of numbness and tingling along the extensor aspect of the thigh; a slight swelling in the region of the process, and distinct crepitation on deep pressure at that point,

especially if the patient contracted the rectus femoris while the pressure was made. "The movable piece of bone gave one a feeling of palpation not unlike that of a loose cartilage in a joint." The treatment was immobilization of the flexed hip in a plaster spica for four weeks. Recovery was complete, but with considerable callus in one case.

Neck of the Femur.—Allis [760 June 17,'93; 233 July,'93] makes an earnest plea for self-restraint on the part of the surgeon in seeking to discover the details of a fracture of the neck of the femur, and for simplicity in treatment and attention to the general health of the patient. He again calls attention to the fact that the existence of such a fracture can often be recognized without manipulation of the limb, and that the principal indication in many cases is to treat the patient rather than the fracture,—that is, to seek to diminish the risk of the patient by minimizing the pain and the confinement, and to leave the fracture to heal without trying too vigorously to prevent shortening or to secure immobilization. While the suggestions may not be very novel, they are always timely, and are stated with the author's well-known clearness and vigor.

Traumatic Separation of the Epiphyses of the Lower Limb.—This subject has been elaborately studied by Tubly [96 Mar.,'94] and Hutchinson. [2 Mar.,'94]

Astragalus.—Desfosses [360 June,July,'94] makes a careful study of fractures of the astragalus on the basis of two personal and thirty-six collected cases.

DISLOCATIONS.

Vertebræ.—Walton [242 Sept.,'93; 99 Dec.7,'93] reports a case of right unilateral dislocation of the fourth or fifth cervical vertebra successfully reduced, under ether, by bending the head backward and toward the left and then rotating it into place. This injury has been the theme of several articles, and Walton endeavors to impress upon the profession the importance of seeking to lift the articular process out of the intervertebral notch by bending the column toward the opposite side and backward, instead of by means of forcible traction. It is hardly just to call the method a new one; but the author has rendered a valuable service in calling special attention to it and to the principles and details underlying it.

Holmes [9 Oct.28,'93] reports a case of right unilateral dislocation of

the fourth cervical vertebra successfully reduced by traction. Death by asphyxia followed forty-three hours after the accident; the autopsy showed crushing of the cord at the corresponding point.

Shoulder.—In the discussion of dislocation with fracture of the surgical neck of the humerus, McBurney $^{96}_{\text{Apr.,'94}}$ describes, with a successful case, a new, simple, and very effective method of treating this combination of injuries. His patient was a man, 45 years old, who had been injured two weeks previously and who had already undergone two unsuccessful attempts to reduce the dislocation (subcoracoid); the fracture was oblique, running from a point near the head on the inner side downward and outward for a distance of about three inches. The author exposed the outer aspect of the upper fragment by a longitudinal incision, drilled a hole in it, and inserted in the hole the close-fitting end of a stout rectangular hook provided with a strong transverse handle, that had been made for the purpose, and by means of which he was enabled to make the necessary traction and rotation. Reduction was readily effected, suitable treatment of the fracture was instituted, and the patient made a perfect recovery.

Bearing in mind that reduction has heretofore been unobtainable in about half of such cases by the methods previously in use, it is evident that this is a most valuable addition to the resources of our art.

Recurrent Dislocation of Shoulder.—Verneuil $^{100}_{\text{Apr.26,'94}}$ made a report to the French Academy of Medicine upon an article by Ricard describing an operation for the relief of a marked tendency to dislocation of the shoulder, which he had employed successfully in two cases in March and August, 1892. The operation consisted in exposing the front of the joint, without opening the capsule, by a long incision corresponding to the interval between the deltoid and great pectoral, with a transverse incision running outward from the upper end of the first along the margin of the clavicle and acromion. Through this incision the anterior portion of the deltoid is widely detached and turned outward. After detachment of the upper portion of the tendon of the subscapularis, the capsule was found to be greatly distended and thinned at its inner part. The arm being fully adducted and rotated inward, three silk sutures, two centimetres apart, were passed vertically

below in the tendon of the subscapularis, above in the thick, strong portion of the capsule beyond the thinned portion, and were then tied, thus changing this thinned portion into a projecting thick fold. Primary union followed with recovery. The limb was immobilized for a month.

Outward Dislocation of the Head of the Radius.—Schröter [226 v.46,p.4] describes a personal case and collects 9 others of uncomplicated outward dislocation, 13 of outward dislocation together with fract-

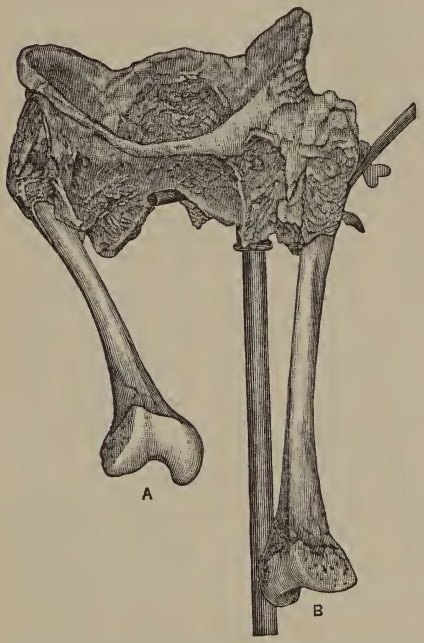


FIG. 1.—ANTERIOR VIEW OF A SPECIMEN OF DOUBLE CONGENITAL DISLOCATION OF THE HIP, AFTER REMOVAL OF THE SUPERFICIAL SOFT PARTS. (BRADFORD.)

A, femur not operated upon; B, operated upon, with improvement in position, but still not in normal position.

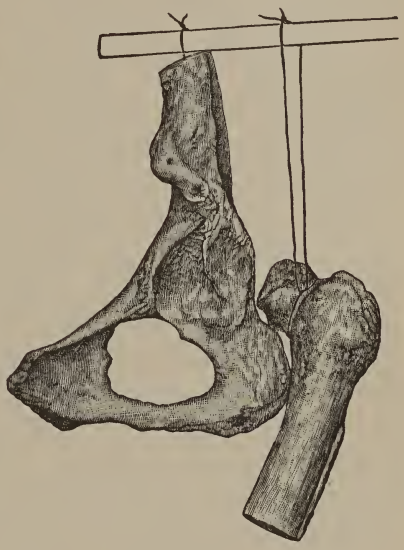


FIG. 2.—VIEW OF INNOMINATE BONE AND HEAD OF FEMUR FROM A CASE OF CONGENITAL DISLOCATION OF THE HIP, AFTER OPERATION FOR FORMATION OF NEW ACETABULUM AND REDUCTION OF THE DISLOCATION. (BRADFORD.)

Annals of Surgery.

ure of the ulna, and 3 of dislocation with fracture of the head of the radius. He also cites 14 cases in which the head of the radius was excised for the relief of various forms of irreducible isolated dislocation with 12 good functional results.

Metacarpal Bones.—A case of dislocation of the metacarpal bone of the thumb backward from the trapezium is reported by Foy [22 July 25,'94] in which reduction failed. Trouillet, of Grenoble, [31 July 28,'94] has made a study of reported cases. Orrillard [100 Oct 7,'93] reports a case

of dislocation of the second metacarpal bone, and collects a few others of isolated dislocation of the second, third, and fourth, and of the combined dislocation of two or more.

Hip.—Harris, of Chicago, $\frac{96}{\text{Sept.,'94}}$ reports a case of dorsal dislocation of the hip, of four months' standing, successfully reduced by arthrotomy, and discusses the subject on the basis of twenty-five collected cases of old dislocations treated by various methods. His conclusion is that reduction by arthrotomy, through an anterior incision, is to be preferred to osteotomy or resection of the head, or to attempts to reduce by forcible manipulation with or without subcutaneous division of opposing tissues.

Congenital Dislocation of Hip.—E. H. Bradford, of Boston, $\frac{96}{\text{Aug.,'94}}$ and T. H. Myers, of New York, $\frac{96}{\text{Aug.,'94}}$ discuss at some length the various methods recommended in the treatment of this affection. Bradford describes an interesting case, with illustrations (on preceding page). His conclusions are as follow: "(1) the methods of treatment by traction or by mechanical means, with or without tenotomy, do not effect a cure; (2) correction by means of forcible reduction without incision can be applicable in but few cases, and is not reliable; (3) the method of operative reduction offers the best prospect of a cure." He adds that the operative method, however, involves risks and is not certain in its results, but that greater precision and more certain results are to be expected; that the shortened condition of the Y-ligament is an important obstacle to reduction, that it needs to be divided, and that its division can be more thoroughly effected by incising from in front than from behind. Myers thinks Paci's method (forcible reduction by flexion, abduction, outward rotation and extension) should first be tried; that failing, Lannelongue's injection of chloride of zinc; "and later still, if the child is not over 10 years old, Hoffa's operation, or Lorenz's modification of it, which seems to be preferable." In old, deformed, or painful cases, Kirmisson's subtrochanteric osteotomy and excision of the head are best.

Habitual Outward Dislocation of the Patella.—Le Dentu $\frac{10}{\text{Apr.10,'94}}$ reports the case of a child, 7½ years old, in which he effected a cure by a method similar to that employed by Ricard in recurrent dislocations of the shoulder, and previously noted.

DISEASES AND INJURIES OF ARTERIES AND VEINS.

By CHRISTIAN FENGER, M.D.,
CHICAGO.

INJURIES TO ARTERIES.

Baughman [61 June 9,'94] describes a case of stab wound in the first division of the subclavian artery. A youth, 19 years of age, received a wound from a knife one and one-half inches above the clavicle and two inches from its sternal end. The blade, which was three inches long, passed downward, backward, and inward. Its withdrawal was followed by a spurt of blood "half as large as one's finger and to a distance of one foot above the boy's head." Two minutes later he was seen by the author and Steele, who employed digital compression, after a futile attempt to expose and ligate the vessel. The wound was packed with absorbent cotton saturated with Monsel's solution, a large pad of cotton (also saturated with the solution) placed over the wound, and a bandage applied. Twelve days later, during which time listerine had been used externally as an antiseptic, the packing was removed, and the wound was found to be filled with healthy granulations. Fever set in, and on the nineteenth day severe hæmorrhage occurred, which almost exsanguinated the patient and ceased only during syncope. The parents would not allow the author to attempt ligation, and the dressing was, accordingly, re-applied. Twelve days later severe hæmorrhage recurred, and afterward at intervals of about two weeks. After the sixth recurrence the wound healed, and three months later union was complete, with no symptoms of aneurism. The patient was weak and the arm useless. No later report is given. Rodman [40 June,'94] ligated the third portion of the subclavian artery for hæmorrhage from a recurrent malignant tumor in a stump left after disarticulation at the shoulder. The hæmorrhage was checked for six days, then recurred as severely as before.

Barling [32 Jan.11,'94] reports a stab wound of the axilla followed by swelling of the upper arm, absence of pulsation in the brachial and arteries of the forearm, coolness of the extremities, and paralysis of the musculo-spiral nerve. The artery was found to be two-thirds divided, and was ligatured above and below. Recovery followed, and the paralysis entirely disappeared. Alvaro [531 Mar.,Apr.,'94] reports a stab wound of the right axilla, in a soldier, followed by arterial hæmorrhage. He ligated the axillary artery through an incision below and parallel to the clavicle. Gangrene of the wound and the whole extremity followed, and an acute, progressive gangrene extended into the pectoral muscles, those of the scapula and the latissimus dorsi. Disarticulation of the arm was followed, on the tenth day, by secondary hæmorrhage, which was stopped by prolonged digital compression of the subclavian artery above the clavicle and, later, by the application of a compression bandage. Recovery.

Bremner [36 Feb.,'94] reports a case of wound in the left buttock from the explosion of a blasting-cartridge. The injury was followed by several copious hæmorrhages. Three weeks later Annandale attempted, without success, to ligate the artery in the wound. Ligature of the internal iliac, however, was followed by complete recovery.

Bell [282 Feb.,'94] reports a case of revolver-bullet wound in Scarpa's triangle, in a boy, followed, a few days later, by swelling and bruit, but no pulsation. One and one-half inches of the wounded artery and vein were removed. Five days later pulsation could be felt in the posterior tibial artery. Recovery.

Lagoutte [211 Dec.24,'93] reports a case of incomplete dislocation of the external condyle of the femur and fracture of the external condyle of the tibia, with tearing across of the popliteal vessels, in a man, from the kick of a mule. Although there was no traumatic aneurism, gangrene followed, which necessitated amputation of the thigh.

Schwartz [14 July,'94] reports a case of two revolver-bullet wounds in the right temporal region, followed by total blindness, but without brain-symptoms. Immediate hæmorrhage from the nose stopped spontaneously, but returned five weeks later and recurred at intervals. Ligation of both external carotids was of no avail. After temporary resection of the nose the author discovered that

the sphenoidal sinus was the seat of the hæmorrhage. The cavity was plugged and the nose replaced. The plug was left for two weeks. Recovery.

Catheterism of the arteries has been proposed by Severeanu, of Bucharest, [73 Aug.11,'94] to remove coagula from the arteries in gangrene of the extremities, due to embolism or thrombosis. During amputation, when the main arterial trunks would bleed only a little or not at all, he introduces, into the lumen of the arteries, filiform bougies (1, 2, and 3 Charrière). Ordinarily the bougie passed up without much resistance; after moving it up and down several times and then withdrawing it, he noticed a number of blood-clots forced out by the blood-current, followed by hæmorrhage. In no case, however, was this procedure followed by a normal arterial jet of blood, but rather by a continuous flow, as from a vein. The author has employed this method in several cases, and believes that the collateral circulation is so improved by the procedure that the gangrene of the amputation flaps, so commonly met with in such cases, is prevented.

Torsion of arteries for the arrest of hæmorrhage is recommended by Murdock. [61 Dec.16,'93] It has been employed, in the Western Pennsylvania Hospital at Pittsburgh, on the femoral artery 160 times, on the popliteal 24 times, on the axillary 24 times, on the brachial 115 times, on the anterior and posterior tibial each 405 times, and on the radial and ulnar 59 times. No secondary hæmorrhage followed. Dundore [451 June,'94] has used torsion in one hundred and thirteen cases of all kinds without a sign of secondary hæmorrhage, and with fewer delayed unions of wounds than when the ligature was employed.

Homologous ligation of divided arteries is a new procedure proposed by Manley, [170 Dec.,'93] after experiments on animals, to obviate the use of foreign substances in ligating arteries. He proposes to use the arterial wall for that purpose in cases where a sufficiently long end of the vessel can be had. At least two inches of the vessel must be liberated and exposed, being drawn out by a clamp-forceps until it is fully stretched. Another clamp-forceps is then applied at the point of emergence from the tissues, exactly as in torsion. Instead of twisting the vessel on itself, however, the walls are utilized for a knot, in the following manner: After the removal of the clamp the end of the vessel, if small, is knotted

upon itself in two or three places. If it be large the end is divided into two or three longitudinal strips; when it is divided into two strips they are simply knotted, but experiments on animals have led the author to prefer splitting the vessel into three segments, turning one in to close the lumen of the vessel and ligating by means of the other two. The free ends are then moderately stretched and tied with a single, double, or treble reef-knot. Traction for three or four minutes is then made on the free ends, the upper forceps is removed, and the vessel released. He finally recommends approximation of tissues either by buried sutures or by deep sutures through the skin. He has not as yet tried this treatment on the arteries of man.

ARTERIAL ANEURISMS.

Billroth, $\frac{8}{\text{No.50,'93}}$ in the last paper read before the Vienna Medical Society before his death, detailed his experience with aneurisms of the extremities and of the neck. Of 23,000 surgical cases 26 patients—24 men and 2 women—had aneurisms, 15 being traumatic and 11 spontaneous. Of the latter 8 were popliteal (1 bilateral), 2 carotid, and 1 subclavian. Extensive atheromatous degeneration was found in only 2 cases. In 7 spontaneous popliteal aneurisms no atheroma occurred. The author believes that weakness and thinness of the internal and medial coats of the arteries predispose to aneurisms, especially in localities like the popliteal space, subject to frequent movements. Small, incomplete tears in the wall of the artery, which gradually increase, here form the beginning of the aneurism. Hyperextension of the knee is probably a common cause. These popliteal aneurisms have the anatomical characteristics of the traumatic rather than of the spontaneous aneurisms.

In the treatment of aneurisms of the extremities and neck the author ordinarily employs compression, with good results. This causes, when cure takes place, the formation of coagula in the aneurismal sac, through or alongside of which, however, a canal remains through which the blood passes. The coagula shrink gradually and become more solid and firmly adherent to the inner wall of the aneurismal sac. Compression can be carried out only with intelligent patients. Digital compression was successful in three cases, in two of which the cure was permanent,

while in one recurrence took place. In one case of carotid aneurism treated by compression, cerebral symptoms, spastic facial contractions, and facial paresis complicated the recovery. Three years later this patient died from pneumonia. Autopsy revealed complete shrinkage of the sac in the trunk of the carotid. Compression may fail for want of patience or when gangrene caused by thrombosis of the artery ensues. The operation of Antyllus —ligation of the artery above and below the aneurism—was employed mostly in traumatic aneurisms,—six times successfully and twice without success.

Billroth's conclusions are as follow:—

1. Popliteal aneurisms have, as a rule, the characteristics of arterial hæmatomata, even when no trauma is found.

2. Popliteal aneurisms, if not too large, permit of the radical operation.

3. When the femoral artery does not feel rigid,—which exceptionally occurs,—it need not be feared that the sac possesses the characteristics of aortic aneurism caused by atheroma, or that the artery is the seat of atheromatous degeneration close to the aneurismal sac.

4. The portion of the artery within the aneurismal sac is denuded and its walls softened. Consequently secondary hæmorrhage is likely to follow ligation at this point.

5. The ligature should be applied outside of the sac or at a distance from the opening in the wall of the artery into the sac.

6. Primary union of the walls of the sac is not to be expected. The inner portion of the sac becomes detached by necrosis. Extirpation of the wall of the sac is not necessary.

7. The wound should not be entirely closed by sutures; the cavity should be loosely packed with iodoform gauze.

In the after-treatment iodoform and glycerin emulsion is used, the cavity healing without disturbance.

Czokor, $\frac{57}{\text{Nov.26,'93}}$ in the discussion of Billroth's paper, stated that every horse has an aneurism, from the size of a pigeon's egg to that of a man's head, in the mesenteric artery of the cæcum, caused by the parasitic worm *Sclerostomum armatum*. Von Schrötter, who sees, on the average, fifteen aortic aneurisms a year, recommends, when practicable, the introduction of silk-worm gut. In one case he found the strings were absorbed after the desired

effect had been produced. Paltauf states that the fundamental cause of aneurism formation is the giving way of the elastic medial coat of the artery. He distinguishes between congenital, parasitic, and spontaneous aneurisms. Congenital aneurisms are usually in multiples (sixty to seventy in the individual), are seldom larger than a bean, and have no surgical significance. Parasitic aneurisms are caused by embolism or by erosion of the arterial wall from without,—ordinarily from tuberculous foci as found in cavities in the lungs. Spontaneous aneurisms are common in patients with increased intra-vascular pressure, as in Bright's disease or valvular disease of the heart. He does not believe that arterio-sclerosis or syphilitic arteritis causes aneurism formation. Ransohoff [96 Jan.,'94] recommends extirpation in all aneurisms of the forearm and leg where the sac has ruptured and caused sudden enlargement, where rupture is impending, in recent traumatic aneurisms, and in arterio-venous aneurisms where operation is indicated. He extirpated, with success, a radial aneurism two inches above the wrist in a man of 22 and a traumatic aneurism of the dorsum of the foot in a child of 12.

Davison [6 May 19,'94] recommends venesection as an element in the treatment of aortic aneurism. In three cases he found that removal of from 27 to 30 ounces (840 to 930 cubic centimetres) of blood was followed by great relief from paroxysmal dyspnœa and from pain. In one case the relief was lasting after nine months, in one case after five, and in the third after four months. In one case the venesection was repeated one year later; 25 ounces of blood were taken and the symptoms were relieved. He advises one copious venesection, as repeated bleedings at short intervals have been known to be harmful.

Gay [99 Mar.8,'94] reports a ligation of both common carotid arteries. The left common carotid was tied on account of a pulsating tumor, the size of a small orange, in the lower portion of the neck. A year later the right common carotid was ligated for a small aneurism at the bifurcation. Neither operation was followed by brain-symptoms, but pulsation returned in a part of the tumor on the left side.

Internal aneurism among European residents of Japan is discussed by Eldridge, [1 Feb.10,'94] who found aneurisms of the abdominal and thoracic aorta of very frequent occurrence, and attributed the

cause to syphilis, which is very common and most often ineffectually treated, especially among the earlier European immigrants.

Bishop [2 Jan.6,'94] reports a case of aneurism of the aorta and innominate artery, in which Cousins performed simultaneous ligature of the carotid and subclavian arteries. The patient, a man 35 years of age, had a pulsating tumor presenting above the right sterno-clavicular articulation. The subclavian artery was displaced an inch and a half outward and its ligation was difficult. Secondary hæmorrhage from the subclavian wound occurred on the ninth day; two more severe hæmorrhages occurred, and the patient died on the thirteenth day. The operator considered the hæmorrhage as venous, and the blood appeared to ooze generally from around the aneurismal sac. Post-mortem examination showed aneurism of the aortic arch and the trunk of the innominate artery. The ligatures were found in position on the carotid and subclavian arteries, and the vessels were perfectly healthy at the points of ligation.

Morse [147 Dec.,'93] describes a case of aneurism of the abdominal aorta, operated upon in 1890 by the Loreta method and cured. The aneurism was two inches in transverse and four inches in vertical measurement, located to the left of and slightly above the umbilicus. A soft, fluctuating spot at the upper border of the tumor could easily be made out through the abdominal wall. The abdomen was opened, the sac exposed, and twenty-eight inches of fine silver wire introduced through a hollow needle. Upon withdrawal of the needle profuse hæmorrhage occurred, which was checked by the use of Monsel's salt. The wound healed in three weeks, but pulsation did not entirely cease. Six months later severe pain in the back occurred, and the patient was treated by potassium iodide, rest in bed, and low diet. Three years after the operation he was presented to the society as practically cured and able to do his work. In another case in which Morse performed Loreta's operation the symptoms were relieved for four years. A secondary sac then formed and burst into the transverse colon. The wire and clot which completely filled the original sac could be plainly seen.

Loreta's operation for aneurism of the descending aorta, also performed by Morse, is reported by Rethers, [147 Feb.,'94] in a man of 40 who had an aneurism, the size of a child's head, on the left pos-

terior aspect of the thorax, extending from the third to the seventh rib, overlapping the spinous processes, and extending out under the scapula. The tumor was exposed by a vertical incision three inches in length, and four and one-half feet of silver wire were passed into the sac through a cannula. Suppuration followed, and the patient died on the seventeenth day from rupture of the aneurism into the left pleural cavity.

In aneurisms of the innominate artery E. de Renzi $^{589}_{\text{May 2,'94}}$ recommends, in addition to absolute rest, potassium iodide, and cold, the use of electricity externally,—the positive pole on the aneurism and the negative pole, indifferently, outside of the latter. In one case this treatment alleviated sterno-cardiac symptoms for years; in another case the aneurism diminished one centimetre and the pulsation became less expansive.

Guinard $^{67}_{\text{Jan.13,Feb.15,28,'94}}$ recommends simultaneous ligature of the common carotid and subclavian arteries, and cites three cases in one of which the operation gave temporary relief. He mentions the statistics of Poivet with six cures and twenty-two improvements out of fifty-five cases. He also states that, the larger the aneurism, the greater is the development of collateral circulation. Large aneurisms on the extremities, for instance, in the popliteal space, can be extirpated without consequent gangrene, while the extirpation of small aneurisms is more commonly followed by gangrene. He recommends simultaneous ligature of the right common carotid and subclavian as the only effective surgical treatment of brachiocephalic aneurisms, whether the aneurism has extended to or commenced in the innominate, the common carotid, or the subclavian artery, or in the arch of the aorta. Exact diagnosis of the extent of the aneurism is, as a rule, impossible. The operation is devoid of danger; subsequent hemiplegia can be guarded against by careful examination of the left common carotid. Later hemiplegia is due not to embolism, but to ascending thrombosis from the place of ligature of the common carotid, and is found only in patients with defective circulation in the left common carotid or its branches, as, for instance, when no pulsation is felt in the temporal artery. Ligation of the subclavian artery is of no effect when the intra-scalenic collaterals are excessively developed, as in large aneurisms, and when digital compression of the subclavian does not change the volume of the radial pulse. When

cases are selected for operation, taking into consideration the two above contra-indications, the result, according to recent statistics, should be about 100 per cent. of recoveries.

Poivet [126 Jan.15,'94] has collected statistics of all the operations for aneurism of the innominate artery, and has formulated the following conclusions: 1. Ligature of the right common carotid, followed later by successive ligature of the left common carotid and right subclavian and axillary arteries, has an operative mortality of 36 per cent., and the patient survives, on the average, eleven months. 2. Isolated ligature of the right subclavian or axillary artery, followed by successive ligature of the left subclavian or axillary and of the right common carotid, has an operative mortality of 33 per cent. and an average period of survival of seven months. 3. Simultaneous ligation of the right common carotid and subclavian or axillary artery has an operative mortality of only 13 per cent. Most of the cases, however, came within the period of antisepsis. Eighteen patients had an average survival period of seven and a half months; in the other nineteen cases the aneurism remained stationary eight and a half months, the period during which they were under observation. The simultaneous ligation of the right common carotid and right subclavian or axillary artery appears, therefore, to be the operation of choice.

Treves [22 Nov.1,'93] performed simultaneous ligation of the right common carotid and subclavian arteries for large innominate aneurism; he applied two catgut ligatures and cut the artery between. In a similar case the patient was alive eighteen months after the operation, and in a third case absolute cure of the aneurism took place.

Monod [14 July 25,'94] cured an aneurism of the third portion of the subclavian artery by simultaneous ligation of the common carotid and the subclavian above the clavicle on the distal side of the aneurism. In most of the cases on record the ligature was placed below the clavicle, and consequently on the axillary artery, and they usually terminated fatally.

Charles A. Morton [2 May 10,'94] reports a case of left subclavian aneurism, the size of a large orange, in which digital compression above the aneurism was employed without effect. Needling was then tried, but with temporary effect only. Direct pressure was attempted, but the patient could not endure the pain. Finally,

amputation at the shoulder-joint was made, the first part of the subclavian being compressed by an assistant. The wound healed in two weeks. Pulsation in the aneurism was absent for two days, when it returned; the aneurism increased in size and ruptured into the subcutaneous tissue three weeks later, with subsequent death of the patient. Amputation at the shoulder-joint for subclavian aneurism, proposed by Ferguson, was first performed by Spence, whose patient lived four years. The three following operations by Holden, Heath, and the author had no permanent effect on the aneurism.

Gallo $^{895}_{\text{Mar.,'94}}$ reports a case of aneurism half the size of an orange in the bend of the right elbow, subsequent to venesection, which was cured by ligature of the brachial artery in its middle third. Derjinshinski $^{21}_{\text{Aug.11,'94}}$ extirpated an aneurism the size of a walnut on the dorsal branch of the radial artery over the wrist. Some time previously the patient had been wounded by a piece of glass. After the healing of the wound the aneurism developed. Prompt recovery followed total extirpation of the aneurism. Develyn $^{77}_{\text{Oct.,'93}}$ reports a case of aneurism of the superior mesenteric in which death was caused by rupture into the peritoneal cavity. The patient, a man of 24 years, entered the hospital because of valvular heart disease following acute articular rheumatism. He had severe paroxysmal pains in the epigastic region independent of eating, yet both food and medicine were generally vomited up as soon as taken. On the tenth day after he entered the hospital collapse suddenly occurred, with severe pain in the median line in the hypogastric region, and he died two hours later. The autopsy showed the abdominal cavity to be filled with clotted blood, after the removal of which a hard mass the size of an orange was found level with the lower border of the epigastric region. Closer examination revealed that the mass was an aneurismal sac formed upon the distal portion of the superior mesenteric artery and adherent to the adjacent intestine for six or eight inches.

S. H. Pinkerton $^{2044}_{\text{'93}}$ reports a case of aneurism of the external iliac in a man, 36 years of age, who had contracted syphilis six years previously and who noticed, while lifting heavy timbers, a sudden pain in the right groin, followed by the formation of an aneurism. Median laparotomy exposed the aneurism and showed disease of the external iliac as high up as the bifurcation of the

common iliac. Intra-peritoneal ligation of the common iliac with chromicized catgut was then made, an inch above the internal iliac, and the abdominal wound closed without drainage. The patient died seventy-two hours after the operation. There was no gangrene of the leg and the autopsy revealed neither peritonitis nor secondary hæmorrhage.

Ganoza $\frac{542}{\text{Dec.,'93}}$ describes an aneurism of the external iliac at Poupart's ligament, in a soldier 28 years old. Forcible flexion in the hip-joint kept up for several hours resulted in obstruction of the aneurism, which, five days later, had retracted to one-fourth of its original size. Eight days later he commenced to walk, and fifteen days after this left the hospital.

Morgan Vance $\frac{1163}{\text{May,'94}}$ reports two cases of traumatic aneurism of the femoral artery. The first case was a 38-calibre revolver-bullet wound in the left thigh, close to Poupart's ligament, in a man of 25 years. Eight weeks later an abscess formed, the opening of which was followed by hæmorrhage on the third day. Six weeks later there was a fluctuating tumor at the upper third of the thigh, and the patient was anæmic and feverish. Incision and the removal of a large quantity of clotted blood revealed an opening in the femoral artery an inch and a half below Poupart's ligament. The artery was ligated above and below, the cavity irrigated with sublimate solution and drained posteriorly. Recovery. The second case was that of a man of 22 years who received a penetrating wound of the right thigh at the lower angle of Scarpa's triangle from a fragment of a chisel which he was striking with a heavy hammer. The immediate hæmorrhage was checked by pressure and the wound healed. Six months later a small aneurism formed which increased slowly until, after two years, it was as large as an English walnut. This was probably an arterio-venous aneurism. It was extirpated, together with the adjoining portion of the femoral vein. On the twenty-third day after operation secondary hæmorrhage occurred, which necessitated re-ligation of the artery above. Recovery was complete in six months. Howard J. Williams $\frac{117}{\text{Jan.,'94}}$ observed a case of traumatic aneurism following a pistol-bullet wound an inch and a half below Poupart's ligament. Six months later a pulsating tumor as large as a man's head had formed, extending from Poupart's ligament to the middle of the thigh. Ligation of the external iliac was

followed by gangrene, from which the patient died five days later. The author regrets that he did not ligate at the seat of injury. Licéaga [179 June 15,'94] ligated the external iliac in a case of spontaneous aneurism, twelve centimetres in diameter, situated immediately below Poupart's ligament. The patient recovered, and fifteen months later the tumor had considerably decreased in size and caused no inconvenience. Prengrueber [14 Dec.6,'93] mentions a femoral aneurism following an incised wound. Ligation of the femoral artery was followed by gangrene and death, and Viard [14 July 18,'94] reports a case of spontaneous femoral aneurism in which ligation of the femoral artery above was followed by secondary hæmorrhage and death. Chidell [2 Feb.10,'94] cured a case of spontaneous aneurism of the common femoral in the right groin an inch below Poupart's ligament, the size of a hen's egg, in a man of 28 years, by digital compression on two occasions for twelve and six and one-half hours, respectively, with five days' interval.

Leutaigne [16 July,'94] successfully treated three cases of popliteal aneurism by ligation of the femoral artery after compression and flexion had been tried without success. In the discussion Franks reported a case of popliteal aneurism in which, after having tried compression and flexion, he ligated the superficial femoral artery in Scarpa's triangle. Pulsation in the aneurism returned, however, and he was forced to do the radical operation; that is, to excise the aneurism. This was followed by dry gangrene of the foot, which rendered amputation below the knee necessary. Chaput [100 May 1,'94] mentions a case of popliteal aneurism in which he applied a ligature to the femoral artery in Hunter's canal, causing contraction of the aneurism; but neuralgic pains in the calf of the leg, indicating compression of the popliteal nerve, necessitated extirpation of the aneurism three weeks later. The aneurism was hard and of the size of a pigeon's egg. The popliteal nerve was adherent to its posterior surface and partly buried in the sac. The nerve was partially divided by accident, but was united by fine-silk sutures. The popliteal vein, which could not be isolated, was extirpated with the aneurism. A year and a half later the patient was well, with the exception of a pain in the calf of the leg upon walking rapidly or mounting stairs. The calf was somewhat enlarged, probably in consequence of deep varicose veins caused by extirpation of the popliteal vein. Prengrueber

cured [14 Dec.6,'93] a popliteal aneurism by ligation of the femoral artery in Scarpa's triangle.

Gerster [96 Feb.,'94] reports a case of posterior tibial aneurism for which the femoral artery was ligated in Scarpa's triangle. The artery was divided between two ligatures and the wound was closed without drainage. The next day hæmorrhage occurred from the operating wound, which led the operator to fear that one of the ligatures had cut through and that secondary hæmorrhage from the femoral artery was imminent. He accordingly applied an elastic ligature loosely above and gave instructions to tighten it in case hæmorrhage should recur. The patient recovered without further hæmorrhage and the aneurism was cured. Stewart [161 Sept.,'93] reports a case of traumatic posterior tibial aneurism from a gun-shot wound. Two months after the injury a pulsating tumor nine inches long was present. The extirpation of the aneurism was attended with difficulty because the arteries were so thin-walled that the ligatures cut through. Forcipressure was then employed, and the forceps were kept in place, with the packing, for four days. Recovery.

Gouley [1 June 23,'94] describes a case of aneurism, two inches and a half in diameter, in the instep. The anterior tibial artery was tied an inch and a half above the tumor, and a ligature was also applied to the distal end of the dorsal artery of the foot. The sac was opened and partially removed and the wound packed. Suppuration followed, but recovery finally took place.

ARTERIO-VENOUS ANEURISMS.

Jayle [7 Nov.20,'93] relates a case of arterio-venous aneurism of the aorta and vena cava superior. A man, 63 years old, was suddenly affected with œdema of the face and neck, more pronounced on the right side. In a few days extension to the upper and then to the lower extremities occurred. The subcutaneous thoracic veins were much dilated. An intense bruit could be heard along the sternum, and pulsation and thrill were felt in the second right intercostal space. Postempsky [41 July 30,'94] mentions a case of arterio-venous aneurism between the external carotid artery and the internal jugular vein. Three years after a wound in the carotid triangle a pulsating tumor the size of a hen's egg appeared, extending from the left mastoid process to the middle of the carotid triangle. The

author performed the radical operation by making an incision along the anterior border of the sterno-cleido-mastoid and placing a provisory ligature around the common carotid. He ligated the external carotid artery below the origin of the superficial thyroid artery and also above the origin of the external maxillary artery. He dilated and ligated the internal jugular vein above and below the sac, which he then extirpated, removing the provisory ligature around the common carotid and packing the wound. The patient recovered, but a slight ptosis of the left lid remained. Keen $^{760}_{\text{Mar.10,'94}}$ operated on an arterio-venous aneurism of the internal carotid artery and jugular vein. Three years previously the patient had received a gunshot wound, the bullet entering below the apex of the left mastoid process. He was unconscious for a time, and, on regaining consciousness, his right eye was blind. The right arm was paralyzed, but whether this was an immediate or remote effect of the injury was not ascertained. The aneurismal bruit and thrill were very marked and could be felt on the left side of the head and neck. There was little external swelling and the patient sought relief from the sound produced by the aneurism. The presence of cicatricial tissue from the wound made the operation difficult. An incision was made along the anterior border of the sterno-cleido-mastoid; the common carotid was first ligated, then the external carotid, and finally the deep jugular vein at a point half an inch below the level of the ligature around the common carotid. The operation was followed by ptosis and immobility of the left eyeball, which later subsided. The bullet was not seen and the author thinks that, after traversing the blood-vessels, it entered the base of the skull and cut the optic nerve between the eyeball and the chiasm. The paralysis of the right arm was due to involvement of the left motor cortex or fibres proceeding from it. The final result as to the aneurism has not yet been ascertained.

Weinlechner $^{57}_{\text{July 8,'94}}$ describes a rare case of aneurism in the temporal region, with pulsation and systolic bruit, causing intermittent neuralgic pain. It commenced after an attack of influenza, and the author concludes that it was due to a mycotic arteritis. Dieu $^{14}_{\text{Nov.28,'93}}$ observed spontaneous cure of an arterio-venous aneurism of the cavernous sinus, the result of a punctured wound with a foil. The usual symptoms of pulsating exophthalmos developed

after the wound, and two years before, when the author reported the case to his society, the members advised against operative interference. Spontaneous cure suddenly occurred, after a somewhat violent bout. The author believes that the sudden, violent efforts of the patient detached a coagulum which had obstructed the lumen of the artery. A slight degree of exophthalmos only remained.

Dumarest [211 Mar.25,'94] publishes a case of arterio-venous aneurism on the left ulnar artery, at the lower end of its upper third, caused by a punctured wound and accompanied by the usual symptoms of arterio-venous aneurism and also by neuralgic pain and paralysis of the ulnar nerve. Gangolphe performed the radical operation, and found the ulnar nerve intact. Complete functional recovery occurred.

Benedict [109 July,'94] relates a case of arterio-venous aneurism in Scarpa's triangle, nine months after a gunshot wound of the thigh. A small, aneurismal sac was present at the place of communication, just below the profunda. The aneurism was cut down upon, the sac grasped with hæmostatic forceps, the femoral artery ligated above and below, and the profunda ligated. The femoral vein was tied above and below the sac. On removing the forceps from the sac a severe venous hæmorrhage occurred. Groping with both hands in the wound, the author caught the femoral vein with the thumb and forefinger above and below the sac, but the hæmorrhage continued. The patient was now seemingly almost dead, when the sac was seized by the hæmostatic forceps and the hæmorrhage ceased. The forceps was left in place and the wound packed with bichloride gauze. Two days later the forceps was removed and the patient made a complete recovery. Montaz [14 Dec.6,'93] operated on a case of arterio-venous aneurism of the femoral artery at the apex of Scarpa's triangle, caused by a small piece of metal puncturing the femoral artery. As the author found no tumor, but bruit and expansion, at the place of the cutaneous cicatrix, he first ligated the femoral artery two centimetres above and below this place. He then separated the artery from the vein and found the foreign body close to the opening between the two vessels, upon separation of which considerable venous hæmorrhage occurred. This was controlled by seizing the wall of the vein with an hæmostatic forceps and applying a lateral ligature.

The patient recovered and more than a year afterward was in perfect health.

Cunningham [451 Mar.,'94] describes a case of traumatic arterio-venous aneurism in the popliteal space, subsequent to a 32-calibre-bullet wound. A year later a tumor formed and threatened rupture. Pulsation and tumor disappeared upon ligation of the femoral artery in Scarpa's triangle. Six days later gangrene appeared on the inner side of the knee, and posterior to this an abscess in which the bullet was found. Fourteen days after the ligation dry gangrene of the foot and leg necessitated amputation at the thigh. The patient died twelve hours later. The author recommends the radical operation in cases of this kind.

INJURIES OF VEINS.

Robin [188 Feb.11,'94] relates a case of rupture of the vena cava inferior. During a sparring match, a strong man, aged 35, died suddenly. The autopsy showed the abdomen to be full of blood, and a transverse rupture of one-half the calibre of the vein was found over the fourth lumbar vertebra. The wall of the vein was unusually thin, and upon examination showed atrophy of the muscular tissue, which was almost absent at the point of rupture. The author has collected the cases from the literature and divides the ruptures into three classes: those from anatomical causes, those due to traumatism, and those caused by tumors.

Comby [14 Dec.17,'93] exhibited to the Société médicale des Hôpitaux a patient cured after obliteration of the superior vena cava. In the course of two years an enormous collateral circulation had developed on the thorax, sides, and abdomen, the cutaneous veins being enlarged to the size of the femoral or iliac. For two years he had to remain in bed or in his room. The author believes the cause to have been a benignant tumor in the anterior mediastinum. Treatment consisted of stimulants—digitalis and potassium iodide.

Merlin [228 Apr.15,'94] reports a case of obliteration of the vena cava superior in a man of 34 who had previously been in good health. He had a right molar tooth extracted and within twelve hours the whole of the face became œdematous, together with exophthalmos and swelling of the tongue, the œdema extending down the neck. Frequent attacks of dyspnœa obliged the patient to remain in a sitting position and to avoid exercise. Later on the œdema

extended to the upper extremities and thorax as far as the umbilicus. Iodide of potassium, 4 grammes (1 drachm) a day, was prescribed, and after four weeks he left the hospital much improved; the œdema had diminished more than one-half and the difficulty of respiration had disappeared. The patient gradually improved, and four years later was in perfect health. The author, despite the patient's denial, believes syphilis to have been the cause. According to Oulmont, the disease terminates fatally in from one to five months, but Comby's and the above case prove that recovery is possible.

Turazza [589 Mar.8,'94] describes two cases of lateral ligature of veins,—one for a small opening in the deep jugular vein during the operation for ligature of the common carotid, and one for a small opening in the axillary vein during the removal of carcinomatous lymph-glands. Both patients recovered. The same author [589 Mar.8,'94] sutured a wound in the internal saphenous vein made during herniotomy for crural hernia. The patient died from other causes ten days later. The autopsy showed that the vein was open and the sutured wound healed. Marin [1 Oct.7,'93] reports suture of a wound of the brachio-cephalic vein. A man received a pistol-bullet wound, the ball passing through the left sterno-clavicular articulation backward through the right sterno-cleido-mastoid muscle and out at the inner third of the clavicle. Hæmorrhage almost to exsanguination followed. On respiration and with the patient at rest the bleeding would stop, but would recur on the least exertion. The clavicular portion of the right sterno-cleido-mastoid was divided and a wound one centimetre in diameter was found at the division of the brachio-cephalic vein into the internal jugular and subclavian veins. Fine catgut sutures were now passed through the entire width of the wall of the vessels; this effected definite hæmostasis and speedy recovery followed. In another case a wound in the femoral vein made during extirpation of a carcinoma in Scarpa's triangle was successfully united by two catgut Mathais sutures. Bayer [2126 '94] also recommends sutures in wounds of veins.

THROMBOSIS OF VEINS.

Handford [2 Dec.16,'93] observed a case of recurrent attacks of venous thrombosis in a man of 37, who gave a previous history of syphilis

and who had had, in two years, nearly thirty separate attacks of thrombosis of the legs and lower part of the abdomen. He derived the greatest benefit from mercury and iodide of potassium. Reynier [14 Oct.22,'93] successfully practiced resection of the veins to prevent embolism in a case of thrombosis. The patient, operated by Isch-Wall, presented symptoms of thrombosis and inflammation in a voluminous group of old varicose veins on the inner side of the left leg. The thrombosis extended up the internal saphenous vein into the Scarpa triangle, and symptoms of pulmonary embolism appeared. Ten to twelve centimetres of the upper portion of the saphenous vein were resected; the temperature promptly came down and the hæmoptysis and other symptoms of pulmonary infarction disappeared. The author remarks that, although ligature or extirpation of inflamed veins has often been resorted to to prevent or stop pyæmia, this case was of special interest because the pulmonary symptoms, already well developed, promptly subsided after operation.

Fowler [157 Apr.,'94] publishes a case of thrombosis of a saphenous vein simulating irreducible femoral hernia, in a woman of 28. The patient, in addition to varicose veins on both legs, had a large varix of the upper portion of the saphenous vein, forming a reducible tumor in Scarpa's triangle. During an attack of fever the tumor became firm and painful, extending from the middle of Poupart's ligament four inches downward to the middle of Scarpa's space, and transversely from the inner edge of the sartorius to the outer edge of the adductor longus muscle. The tumor was irreducible and non-fluctuating. Pulse, 110; temperature, 103.8° F. (39.9° C.). During extirpation several venous branches as large as a lead-pencil were ligated. The temperature fell to normal three days later. The specimen removed revealed a varix, the size of an English walnut, filled with a thrombus.

VARICOSE VEINS.

William H. Bennett, [6 May 5,'94] in a clinical lecture upon varicose veins of the upper extremities, or dilatation of the veins of the arms, calls attention to the fact that little mention is made, in the text-books and literature in general, of this pathological condition, which, nevertheless, frequently causes discomfort. He selected for discussion his last 60 cases of affections of the veins of the

upper limbs. Of these 60 patients 18 came to him on account of varicose veins which were so large and so tortuous as to cause marked discomfort. The other patients presented diffuse dilatation of the veins; in 26 of these the dilatation followed injury and in 14 the dilatation was spontaneous. The diffuse dilatation is caused, he considers, by valvular insufficiency, which begins in the valve nearest to the proximal vessel and later extends to the more distal ones. The insufficiency is not infrequently caused by some injury,—the result of lawn-tennis, heavy-weight lifting, foot-ball, sprains, wrenches while rowing, etc. The injuries were almost always apparently trivial, but were sufficient to cause a valve to give way under the extreme pressure. The consequent dilatation of the vein caused pain and discomfort, especially marked when the limb was in the position in which the original injury had been received. In one case the patient attempted to raise a heavy weight while lying on his back. He suddenly experienced a sensation as if something had cracked in the upper part of his forearm, and this was followed by a considerable enlargement of the veins on the outside of the forearm, especially marked when the arm was in certain positions, and causing inconvenience. The author gives in detail three interesting cases. He points out that true varicose veins should be treated on the same principle as varicose veins of the lower extremities, and that extirpation, although less frequently indicated in the upper extremities, gives better prospects for radical cure than in the lower limbs, as the veins in the arm can be more completely extirpated. Diffuse, non-varicose dilatations of the veins call for elastic compression or operation. In many cases a well-fitting elastic support gives complete relief of symptoms. When this fails and operation becomes necessary, the author has found that multiple division of the veins between ligatures is sufficient and that extirpation of pieces of the veins, so often necessary in the lower extremities, is not needed for valvular insufficiency in the veins of the arms. He believes that in old age all vein-valves tend to become incompetent, and that this, together with senile muscular weakness, causes venous stasis and discomfort, which can often be overcome by massage and a light, spiral, elastic support.

Cazin $\frac{7}{\text{No.10,'94}}$ cites a case of varix of the saphenous vein in its upper portion in a man of 46, who entered the hospital for oper-

ation upon a crural hernia. The tumor had developed, in three years, to the size of a large walnut, located two fingers' breadth below Poupart's ligament. It was covered by normal skin; was soft, slightly nodular, irreducible; and did not transmit impulse on coughing. There was no trace of varicose veins on the lower extremity. Segond extirpated the tumor, which was situated three centimetres below the entrance of the saphenous into the femoral vein, and the patient recovered.

Villar [188 Dec.24,'93] describes a voluminous dilatation of the internal saphenous vein, forming a semiglobular, fluctuating tumor the size of an orange, covered with thin, bluish skin. The saphenous vein above and below showed varicose dilatations filled with hard thrombi. The author successfully extirpated the tumor, which proved to be an enormous dilatation of the saphenous vein, all three coats of the vessel participating in such a manner that the outer and inner coats were thickened and the middle or muscular coat was weakened.

Robitzsch [96 Aug.,'94] describes the treatment of varicose veins with Landerer's bandage, which resembles a garter, the inner surface of which is armed with a parabolic spring carrying a cushion filled with water or glycerin. This band is applied below the knee with a pad on the great saphenous. When the disease extends higher up the band is placed above the knee, and when it extends into Scarpa's triangle a bandage like that used for crural hernia is applied. The band should be so applied that the finger can easily pass beneath it so as not to impede circulation in the rest of the leg and only compress the saphenous vein. One hundred cases have been treated in Landerer's clinic by this method, with most satisfactory results. Several of the patients wore the apparatus for more than two years, about 90 per cent. being relieved of the discomfort due to the varicose veins. The pain and the œdema of the leg disappeared, the eczema and ulcers healed more rapidly, and it was ascertained that the healing was more permanent when the patient was at work than when he was in the recumbent position. The apparatus is less expensive than the elastic stocking. The glycerin filling has to be renewed only once in three or four months or the water filling every six weeks. Irvine [199 June,'94] successfully treated an obstinate case of varicose ulcer of the leg by ligature of the varicose veins, curetting of the ulcers,

excision of the callous borders, and union by deep silver-wire sutures. When approximation was impossible skin-grafting was resorted to, with success, the grafts being taken from the back of a chicken.

Delore [211 June 3,'94] disapproves of extirpation of the saphenous vein, which, he claims, was not originated by Trendelenburg, but had been proposed and executed by Rima, an Italian surgeon, in 1840. He recommends intra-venous injections of iodine and tannic acid, which cause a plastic phlebitis, obliterating the veins. He regards the danger of embolism as chimerical. Wolff [21 Sept.8,'94] recommends ligature of the saphenous vein—Trendelenburg's operation—for varicose veins of the lower extremities. Since 1889 twenty-two patients have been successfully operated upon by this method in the Obuchow Hospital. The operation is done under cocaine anæsthesia and the first dressing untouched for a week. In all cases great symptomatic relief followed and the ulcers, eczema, and hæmorrhage permanently subsided. Although the author cannot make a definite statement as to the final results, he states that a good temporary result is always seen. Dombrowski [21 Aug.18,'94] declares himself in favor of Madelung's rather than of Trendelenburg's operation on the saphenous vein. Madelung extirpates; Trendelenburg merely ligates the saphenous vein at the border of the middle and lower thirds of the femur. The ligature is an old method revived by Trendelenburg on the theory that the troublesome symptoms from varicose veins are caused by increased blood-pressure through the great saphenous vein, in which the valves have become insufficient. It is not possible, from the cases as yet published, to judge of the relative value of the two operative methods, and it is a question whether Madelung's operation, being more radical, is not also more dangerous. The author presented a patient in whom excision of the great saphenous vein, combined with excision of a diseased branch of the latter, caused the disappearance of two varices, the size of goose-eggs, situated below the knee. He advises not to close the operating wounds tightly, but to leave openings for drainage. In the first case he operated upon, a tight continuous suture of the wound in the skin gave rise to retention of secretions and septic inflammation.

Soldani [589 Aug.17,'94] regards resection of a portion of the saphenous vein as more effective and not more dangerous than ligation.

Extirpation was first devised by Rima, of Venice, who obtained 10 cures, 22 non-successes, and 2 deaths from 34 cases. In a case of extensive varicose veins, large ulcers, with extensive eczema and œdematous swelling of the leg, operated upon by the author, cure followed, which was perfect two years later.

ORAL SURGERY.

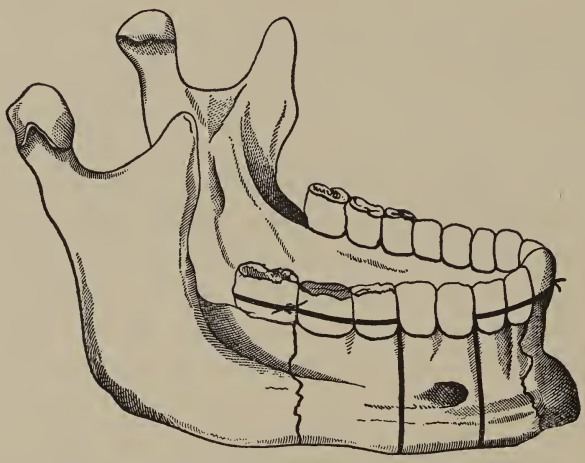
By RUDOLPH MATAS, M.D.,
NEW ORLEANS, LA.

JAWS.

Fracture; Dislocation.—In a case of compound fracture of the lower jaw treated by H. N. Rucker, of Oakland, Cal., $\frac{227}{\text{Jan.,'94}}$ firm bony union did not take place until after six months, although the patient was a young, vigorous man, and a carefully-constructed Kingsley retentive apparatus had been employed. J. D. Thomas, of Pittsburgh, $\frac{451}{\text{Jan.,'94}}$ in a case in which the fragments could not be held in place by ordinary means, applied anterior and posterior malleable-steel splints to the teeth, and, by means of a clamp uniting the two bands, successfully held the fragments in suitable position. To hold detached pieces of the ramus in apposition with the other fragments, H. H. Vinke, of St. Charles, Mo., $\frac{364}{\text{Mar.15,'94}}$ passes a large, curved needle, armed with a strong thread, silk, silk-worm gut, or silver wire, around the broken fragment, entering it on the inner side of the jaw and drawing it out on the inner side of the cheek. Care is taken that no soft parts of importance be encircled by the needle. The latter is removed, and the two threads upon which the broken fragment rests are tied so as to tightly secure the loose piece in two loops. By pulling on the threads the loose fragment can be brought in position and retained there by fastening the threads around the teeth in the jaw on either side of the loose fragment. The position of the threads is shown in the illustration on next page.

A. C. Hugenschmidt, of Paris, $\frac{808}{\text{Nov.,'93}}$ in a case of fracture and violent suppuration around the incisive alveolar portion of the superior maxillary, re-implanted a lateral incisor in the same, eight days after the injury, after carefully disinfecting the parts and the tooth for a period of only two days. The insertion of the latter did not give rise to the least inflammatory disturbance, and three weeks later the union of the fractured bones was complete and the tooth firm in its place.

C. A. Powers, of New York, $^{96}_{\text{Feb.,'94}}$ reports the case of a young woman in whom he successfully reduced a dislocation of the inferior maxilla of one hundred and thirty-six days' standing. After the reduction the lower incisors projected somewhat beyond the upper, this being probably due to thickening in the glenoid fossa. A plaster-of-Paris bandage was applied and left on for four weeks, the patient meanwhile being fed through the nose. Restoration of function began as soon as the splint was removed, and perfect recovery followed. The author was not able to find, in the literature on the subject, a delay of more than one hundred days before reduction had been performed.



Method of Holding Detached Pieces of the Ramus in Apposition with Other Fragments of the Jaw. (Vinke.)
Medical Fortnightly.

Odontoma.—A. Swann, of Batley, $^{6}_{\text{Dec.9,'93}}$ reports a case of this rare form of tumor, nine cases of which are on record, according to Christopher Heath. The patient, a woman 40 years of age, had received a blow from the "picker" of her loom over the right side of the lower jaw. Soon afterward a hard swelling formed, which was poulticed until it burst. The swelling, however, became no less, but continued to discharge; and there was a sinus leading down to what felt like roughened bone. The growth attained the size of a large filbert, and was situated on the right side of the chin and directly below the position formerly occupied by the canine and anterior bicuspid teeth. The patient having been placed under the influence of ether, he made a submental

incision, and, turning up the upper flap, found, deeply situated in the substance of the lower jaw, on its anterior aspect, a hard, dentine-like growth, which required the free use of chisel and mallet for its removal. The posterior bicuspid was displaced to some extent, the fang lying obliquely in the jaw, with its crown looking toward the mouth. The patient left the hospital cured in about three weeks. Four years after the operation the alveolus had slightly fallen in where the growth had existed, but otherwise she was perfectly well.

Epithelioma.—Nové-Josserand and Bérard [91 June,'94; 5 Nov.,'94] describe a case of tumor of the left lower maxilla occurring in a woman 29 years of age, and which, added to three similar cases previously seen, warranted, in their opinion, the recognition of a distinct class of benign, solid tumors of paradental origin,—adamantine epithelioma. The clinical picture shows a slow development, intra-osseous in origin, with a tendency to break out on to the surface of the bone, the point of predilection being the angle of the jaw. Painful symptoms are absent; there is anæsthesia of the nerves in the locality. Although the differential diagnosis is easily made between malignant and benign tumors, it is not so easy between the solid tumors and the paradental cysts, except when fluctuation is definitely made out, or where an exploratory puncture discloses fluid. The diagnosis has, however, little bearing upon the operative procedure in the case. The case is different when the operator comes upon a solid tumor which is hard to distinguish from malignant disease; if benign it requires only curetting, while more radical measures are needed for malignant disease. The clinical characteristics of the adamantine epithelioma are here of great value; it is more friable than a sarcoma; it does not involve the bony capsule, but is sharply limited by it, and there is to be found within the cavity a tooth more or less developed, which, however, it may require diligent search to find, but its presence clears the diagnosis and determines the operative procedure. The prognosis in these tumors is favorable, but perhaps not so favorable as in the case of cysts, and further study may make more radical measures of treatment necessary.

The histology of epitheliomatous cysts has been studied by Kummer [197 Nov.,'93; 126 Oct.15,'94] in two cases, one of which presented the characters of the paradental cyst of Malassez. He considers that these

growths may originate from the epithelium of the gums, the adamantine organs, and the paradental membrane. Malassez's conclusions were also verified by Becker, of Bonn, $\frac{226}{V.47}$ in a valuable paper upon these benign growths. A comprehensive review of the different forms of the maxillary cysts was published by A. Barillet. $\frac{577}{Apr.,May,'94}$

Operations.—The apparatus recommended by Claude Martin, of Lyons, in 1889, including the insertion of an artificial rubber section in lieu of the bone removed, was successfully employed by Michaux, of Paris, $\frac{14}{Nov.19,'93}$ in a case of recurring epithelioma of the inferior maxillary. The wound healed by primary union. The artificial jaw was held in place by two projections,—one anterior, going to the remaining part of the lower jaw, and the other posterior, resting on the posterior portion of the superior maxillary bone. On the twelfth day the patient was moving his jaw naturally and spoke without trouble. The result was very satisfactory and the deformity slight. McBurney, of New York, $\frac{96}{July,'94}$ successfully employed in three cases, immediately after the operation, a well-fitting interdental splint, having for its object to so hold the jaw in place as to prevent, for the time being, its displacement by the unopposed muscles. Soon after a special spring was added, one end being fastened to the divided lower jaw, the other to the posterior molar teeth above. This was soon replaced by a set of artificial teeth, with a piece of gutta-percha of sufficient size to fill out the cheek over the removed bone. These appliances were made from casts, by a dentist (Westlake). During the use of the spring the patients acquired such control over the half of the jaw that they could articulate and masticate when the spring was not in place. In a case of resection for sarcoma, Thiéry, of Paris, $\frac{7}{June,'94}$ applied permanent artificial steel fragment as advised by Verneuil, many years ago. No oxidation took place, and the case resulted satisfactorily. He strongly recommends the immediate insertion of artificial fragments, which prevent the great deformity that results after resections and preserves all the functions of the jaws. Martin $\frac{211}{Dec.10,'93}$ published an additional observation, and able reviews of the whole subject were given by Dubois $\frac{781}{June,'94}$ and Michaels, of Paris. $\frac{781}{May,'94}$ The latter operator extends the use of an articulated prothetic fragment to the arm, and a case is described showing the successful application of the idea. Péan, who saw the case,

concluded that such apparatuses could be successfully used to replace lost bone, provided that the substance of which they were constituted was non-absorbent and absolutely aseptic. Immediately inserted, they would prevent muscular massing and preserve articular motion.

LIPS.

Tuberculosis.—N. Senn, of Chicago, [82]Mar.3,'94 reports a case of tuberculosis of the lip of a young woman. This condition has only recently been described and consists of a tubercular infection of the submucous glands of the lip. Though long ago recognized as a clinical fact associated with the so-called strumous patients, it was formerly described as the scrofulous lip. The treatment consists of the parenchymatous injection of the iodoform emulsion. Great improvement has taken place in the author's case under the injections already made. They are repeated every three or four weeks.

Epithelioma.—I. S. Batashoff [530]No.14,'93; [2]Oct.27,'94 reports a case of epithelioma in a girl 13 years old. The child, who was healthy and well nourished and came of a healthy family, had a rapidly-growing lump in her lower lip, which had been first noticed a month previously. The tumor was the size of a large pea and was situated in the thickness of the lip, a little to the left of the middle line; it was of uniformly-hard consistence, and had very indistinct boundaries. It was slightly tender, but otherwise caused no discomfort. The submaxillary lymphatic glands on both sides were somewhat enlarged, but painless and freely movable. There was no history of traumatism or family predisposition to malignant disease. The only noteworthy etiological fact was that the girl was residing in a notorious cancerous locality in Taloshnya, Novotorshsk District, Tver Government. Of 404 cases admitted to a local Zemskaia hospital in 1891, as many as 23, or 5.7 per cent., were cases of cancer. On the other hand, in an adjacent district of the Tula Government, the total number of cancer cases admitted to a similar hospital during the last five years was less than 10. Taking into consideration this fact, together with the consistence, rapid growth, and diffuse character of the tumor, Batashoff diagnosed a cancer and excised it without delay. The microscope showed that it was a typical, rapidly-growing epithelioma. The wound quickly healed. No

recurrence had taken place up to the date of report, seven months after the operation.

Cavernous Angioma.—In a case of cavernous angioma of the upper lip Roubetz $^{571}_{\text{No.2,'94}}$ obtained a rapid cure by injecting a 10-per-cent. solution of perchloride of iron. Five drops were injected at the first sitting, ten at the others, twelve sittings in all, covering a period of six weeks. The operator isolated the tumor before each application by applying forceps around the growth and an elastic ligature around the head, the latter passing under the ear-lobes and the alæ of the nose. One year later there was no trace of the tumor. Verneuil many years ago taught this method.

Fibroma.—Fibromata of the lips are exceedingly rare, the tumors usually described under that histological subdivision being generally of another nature. Mermet, of Paris, $^{7}_{\text{No.9,'94}}$ however, describes a growth the fibromatous nature of which is not to be doubted, the microscopical examination having been based upon carefully-conducted differential researches.

Operative Procedures.—W. W. Keen, of Philadelphia, $^{144}_{\text{May,'94}}$ calls attention to a method of operating about the face which is particularly applicable to epithelioma of the lip, of which he had had two severe cases in a comparatively short time. In one there was extensive epithelioma requiring removal of a portion of the upper lip, the lower lip, and the cheek. The other case was one of epithelioma of the cheek, and was also of interest from the fact that the patient had originally been operated on forty years ago by Morehouse. A microscopical examination was made at that time, and the tumor was said not to be epithelioma. When he saw the man the disease extended from the angle of the mouth back to the molar teeth, and from one jaw to the other. It was on the inside of the mouth exclusively, except at the angle where the entire thickness was involved. The external layer of the cheek seemed to be entirely free. In operating Keen placed the patient on a flat table with the operated side turned a little down and cut through the skin down to the mucous membrane, but not through the latter. He then secured all the vessels before opening into the mouth, and in this way prevented blood from entering the mouth and also lessened the bleeding. In this case Stenson's duct was involved in the operation; having found the duct, he stitched it to the mucous membrane of the upper jaw; there has

not been the slightest trouble from fistula. The incision was a very wide V, the linear incision corresponding to the apex of the V being on the cheek, and the widest part was the base of the V inside of the mouth.

SALIVARY GLANDS.

J. W. Hulke, of London, [6 Jan.,'94] describes three interesting cases of salivary calculi. In two of these the local subjective and objective symptoms gave rise to the suspicion of cancer; in the third the calculus was in the deeper portion of the submaxillary gland and there were repeated formations of stone and abscesses. In an instance recorded by Clinton Wagner, of New York, [11 Nov.,'93] the calculus weighed 93½ grains (6.23 grammes),—the largest on record, according to the author. Sorel [203 Mar.15,'94; 126 Oct.15] reports a case in which repeated catheterization did not disclose the presence of a calculus; the canaliculitis persisting, however, an incision was made over an elevated spot at the angle of the jaw. A small calculus was found, and its removal arrested all symptoms.

A rare case was reported by L. von Stubenrauch, [226 v.48,p.26; 126 Oct.15] observed in a man, 60 years of age, who presented a tumor characterized by all the symptoms of a salivary cyst. After extirpation and microscopical examination, the internal surfaces of the growth —a cyst of the parotid—were found studded with tubercular nodules, while the walls were composed of glandular elements completely infiltrated with tubercles.

TONGUE.

Tumors.—W. Sachs [226 v.45,'93; 26 May 1,'94] publishes notes, taken at Kocher's Surgical Clinic at Berne, upon a series of 69 cases; 66 of these were males. In the majority of the cases the origin of the disease could not be determined; but smoking, jagged teeth, and traumata were the most frequent causes ascertained; psoriasis and leucoma were noticed in 4 cases; hereditary taint was obvious in a similar number. The majority of the cases occurred between the fortieth and sixtieth years. In 20 cases a careful histological examination was made and disclosed, with one exception (cylinder-celled carcinoma), typical squamous-celled epithelioma, no matter whether the neoplasm originated as an ulcer or a nodule covered with intact mucosa. In 1 case cancer was combined

with syphilis. The very earliest stages rarely came under clinical observation. In 25 of the cases the affection was limited to the tongue, occupying in 2 the whole of that organ, in 3 more than half, in 7 a half, and in 13 less than half. In 41 cases the neighboring tissues were included in the pathological process, but in only 1 of them was the whole tongue attacked. As a rule, more than five months passed before the patients presented themselves for treatment. Glandular swellings were only missed in 6 cases. Fifty-eight cases were operated on,—17, *per os;* 2, the buccal operation; 21 with temporary resection of the lower jaw; 1, exarticulation of one-half of the jaw; in 12 the operation was submental; in 3 the écraseur was applied submentally; and no data were given as to the remaining 2. The result is recorded in 57 cases; 6 patients died and 51 were discharged cured, or 10.5 per cent. to 89.5. Of the 52 patients who survived the first operation the further fate is known in 38 cases. Recurrence took place in 25 cases; and it was observed that, the more radical the operation, the longer did the patients remain free from recurrence. Butlin, $^{11}_{\text{Jan.,'95}}$ in a clinical lecture, gave his experiences of the removal of the whole or part of that organ in a series of forty-six cases, with only one fatal result. General sepsis and septic affections of the lungs are the complications to be specially guarded against. This is to be done by keeping the mouth wound aseptic, providing free egress for the discharge, and preventing discharge and food from entering the lungs.

In the case of a man who depended upon his speech for a living and who preferred to let the disease take its course to being deprived of that faculty, Abbe, of New York, $^{96}_{\text{July,'94}}$ took out the greater part of the dorsum, by cutting deeply into the muscle and making a boat-shaped incision; the edges of the wound were then brought together. The result was perfect; the man had free use of the tongue, and there had been no recurrence of disease nine months after the operation. The remnant of the tongue extended laterally to facilitate its use, as had been expected. The lingual arteries had been tied in order to lessen the danger of dissemination and hæmorrhage. The operator compared the result with that of an exactly similar case of epithelioma of the tongue seen four years before. The man had refused an operation, and died three months later. Abbe also reported $^{96}_{\text{July,'94}}$ the case of a

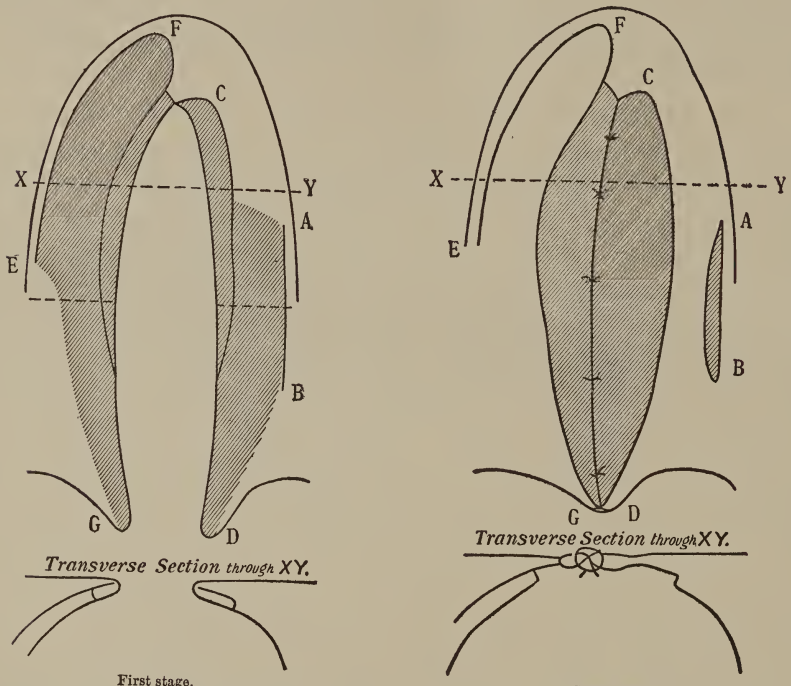
man from whom he had removed a sarcoma of the tongue nine years before, and in which there had been no recurrence.

To relieve suffering in cancer of the tongue W. Morrant Baker, of London, $^{408}_{v.19,p.85}$ recommends the section or removal of adjoining teeth. This measure also limits the irritation which tends to cause extension of the neoplasm. J. W. O'Neill, of Chicago, $^{61}_{Feb.10,'94}$ cautions against the traumatisms inflicted upon the tongue during the administration of anæsthetics, owing to their etiological rôle in the production of cancer. The use of forceps to draw the organ out is considered as dangerous, and the use of dry gauze to prevent slipping between the fingers advocated.

CLEFT OF THE HARD AND SOFT PALATES.

N. Davies-Colley, of London, $^{2}_{Apr.28,'94}$ described a modification and extension of an operation, proposed by him three years ago, which may be considered as an advance in the treatment of difficult cases. It may be divided into three stages: Stage 1. (*a*) An incision, *A B*, is made down to the hard palate in front, and behind through the soft palate, with its centre just internal to the last molar. With a raspatory the muco-periosteum is separated from *A B* inward. (*b*) An incision, *C D*, is made about one-fourth inch from the cleft in front. It runs parallel to the cleft backward, and is continued to the tip of the uvula, splitting the soft palate to the depth of about three-eighths inch in front and a less amount behind. The muco-periosteum between *C D* and the cleft of the hard palate is separated inward with the raspatory as far as the edge of the bone. (*c*) A triangular flap, *E F G*, is raised from the other side of the palate in such a way that the anterior extremity is free and the inner margin runs parallel to the edge of the cleft at a distance of one-sixth inch. In the soft palate the incision is continued backward so as to split that structure in the same way as on the other side. The muco-periosteum of the hard palate internal to *F G* is separated inward and left attached to the edge of the bone. Stage 2. The mesial flaps—namely, those internal to *C D* and *F G*—are united by fine silk or catgut sutures; and continuously with this union the upper planes of the split soft palate are brought together. A bridge is thus formed across the whole cleft, with a mucous surface directed upward and a raw surface downward. Stage 3. The edge, *F G*, of the trian-

gular flap in front, and of the lower plane of the soft palate behind, is united by silver wires and one or two silk sutures to the edge, *C D*, of the hard and soft palates of the other side. A second bridge is thus formed across the whole cleft, with a raw surface looking upward and a mucous surface downward. The after-treatment was that of the ordinary operation, except that, as there was no tension in the hard palate and very little in the soft, the sutures might be left in from three to six weeks. The advant-

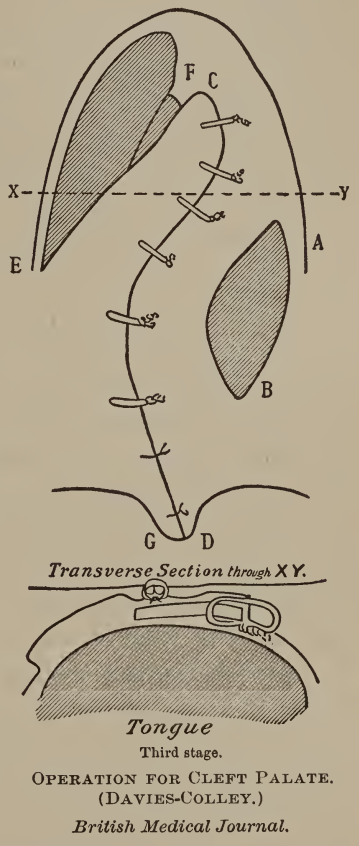


OPERATION FOR CLEFT PALATE. (DAVIES-COLLEY.)
British Medical Journal.

ages claimed for this operation were: (1) no tissue has to be pared away; (2) a much larger extent of raw surface is brought into close contact than in the ordinary operation; (3) the tension is small; (4) the upward pressure of the tongue is beneficial, as it presses the lower against the upper bridge; (5) some advantage is gained by using the muco-periosteum of one side in front of the cleft to help in bridging the gap of the hard palate. The only drawback to the operation was that the application of so many

sutures made it rather longer than the ordinary operation. In each of the six cases upon which he had employed this method, union had been complete over at least four-fifths of the cleft. Three of the patients were between the ages of 1 and 2 years; of the three others, two were between 2 and 3 years, and the third was $3\frac{1}{4}$ years old.

Durham, in discussing the operative procedures, remarked that if the whole of the gap could not be closed at once it was better to close the opening in the hard palate first. A large and sufficient supply of blood would flow through the descending and posterior palatine arteries to nourish the flaps.



Third stage.

OPERATION FOR CLEFT PALATE. (DAVIES-COLLEY.)

British Medical Journal.

Julius Wolff, of Berlin, [96 Nov., '94] operates much in the same manner; after separating the flaps he leaves them for four days to control hæmorrhage. In 160 cases operated upon since 1872, 85 were children under 6 years of age, and the results were as follow: Out of 39 cases of children under 18 months old, death resulted in 7 cases. All of 13 operations in children between $1\frac{1}{2}$ and $2\frac{3}{4}$ years gave good results. Out of these 13 operations were no deaths, no failures, and no incomplete results. The remaining 108 cases, among patients ranging from 3 to 52 years, show 2 deaths. One of these occurred in a child of 4 years and the other in one of 5, though the fact of the age had nothing to do with the deaths. The greatest mortality is observed under 18 months, though these figures are much better than the statistics in general literature.

An interesting addition to present methods of closing large congenital fissures of the hard palate is contributed by H. M. N. Milton, of Cairo. [6 July 14, '94] In a case of complete and wide fissure he

took a firm grip of the alveolar processes of the two superior maxillæ with the sharp points of a strong pair of forceps, shaped somewhat like a lion-forceps, and with very considerable pressure, exerted with great care, at once brought together the two maxillæ along the greater part of the fissure, the only obstacle to their complete approximation being the interposed septum nasi. The snout was then forced down without difficulty to take up its position between the two maxillæ. A delta-metal wire was next passed round the three portions of the upper jaw. Posteriorly it stretched across from the last right premolar to the last left premolar, lying below the newly-approximated palate. Laterally it lay on either maxilla, in the groove between the gums and teeth; anteriorly its ends were twisted together on the teeth carried by the intermaxillary bone. The maxillæ being firmly held in their new position by the forceps, the wire was twisted up as tightly as possible, binding the three portions of the jaw firmly together. The child had absolutely no reaction after this operation, and wore the wire comfortably for thirty-eight days, eating his ordinary meals after the first week. On the removal of the wire the bones retained their new positions absolutely, and a very simple plastic operation remained necessary to unite the skin and mucous membrane from the lip to the uvula.

Mears, of Philadelphia, $\frac{96}{\text{Feb.,'94}}$ after an experience based upon a large series of cases, gives preference to Ferguson's method. The edges being freshened, the sutures are deposited through openings made by the drill in the bony processes; these are then divided by the chisel or saw and drawn over to the middle line. Division of the soft palate downward is necessary. In cleft of the soft palate, with notching of the palatal process, the bone is divided and brought together in the median line. Owen, of London, $\frac{22}{\text{May 16,'94}}$ detaches the muco-periosteum from the back of the hard palate in order to gain a slackness of tissue at the anterior part of the cleft in the velum. He further diminishes tension by lateral incisions passing through the soft palate parallel to the line of the sutures. Some of the sutures are of silver wire and others of horsehair.

R. W. Murray, of Liverpool, $\frac{6}{\text{Apr.28,'94}}$ employs the same procedure, but for sutures he uses green gut and horsehair, never having used harelip-pins. All the stitches being tied, he completes the operation by compressing the ala of the nostril on the

affected side against the nasal septum by means of a button suture. This suture consists of two small discs of lead slightly convex on one side (the side which is applied next to the skin), with two holes about their centre. One of these is threaded with silver wire armed with a large needle, the wire being twisted into a single coil to the estimated thickness of the septum and ala. He passes the needle through the nasal septum well within the nostril and out through the junction of the ala and cheek, cuts the needle free of the wire, threads the other disc, presses the two discs together, and fixes them by twisting the wire. He leaves the button suture in for a longer time than the other stitches, taking it out about the end of a week. On removing it the nostril on that side remains compressed for a day or so, but it soon rights itself. He has not found that the sutures leave any appreciable mark or cause any deviation of the septum, and has found them very satisfactory in twenty cases.

ANÆSTHETICS IN ORAL SURGERY.

During an operation on a boy for an hyperostosis of the upper jaw, by Pearce Gould, $^{22}_{\text{Oct. 4, '93}}$ the patient suddenly started up, struggled, kicked, and expectorated; it was evident that some liquid chloroform had gotten into the mouth and burned the mucous membrane; had the boy been deeply narcotized and unable to spit out, in all probability he would have died. The reason of the chloroform getting into the boy's mouth was that the bottle fastened to the anæsthetist's button-hole, and through which the vapor was conveyed to the patient through a tube, had gotten tipped up,—an accident which can easily happen. Gould concluded that: 1. Great care and attention must be taken always to keep the bottle vertical. 2. In all operations about the mouth, throat, etc., the patient should not be altogether narcotized; so that, if any liquid chloroform should by accident get into the mouth, sufficient consciousness might remain for its immediate expectoration.

Sunderland $^{2}_{\text{May 5, '94}}$ records the deaths of two children from the entrance of blood into the trachea while they were under chloroform for, in one case, an operation for harelip and, in the other case, for the removal of adenoid growths from the pharynx. James Murphy $^{2}_{\text{May 5, '94}}$ draws attention to a very simple means by

which such accidents can be prevented,—viz., by placing the patient's head over the end of the operating-table, letting it fall below the level of his body. It is simply an adaptation of Rose's position. By this means it is impossible for the blood to enter the trachea; and such operations as those for cleft palate, harelip, or removal of tongue, jaw, tonsils, etc., can readily be

Position of Head during Operations on the Mouth. (Murphy.)
British Medical Journal.

done without the least risk of any blood entering the air-passages. Patients take chloroform well in this position; and though, owing to the dependent position of the head, there may be a little extra hæmorrhage, this is of no consequence, as it flows out through the nostrils or mouth. He learned the procedure years ago from Trélat, of Paris. The above illustration shows the position in which the head should be placed.

TUMORS AND SURGICAL MYCOSES.

By ERNEST LAPLACE, A.M., M.D.,
PHILADELPHIA.

MALIGNANT TUMORS.

Bacteriology and Pathology.—A most interesting discussion on this subject took place at the Eleventh International Medical Congress at Rome, in which Pio-Foá, Cornil, Duplay, Cazin, Ruffer, and others participated. $\frac{99}{\text{Apr.19,'94}}$ Pio-Foá is one of the most strenuous advocates of the parasitic or infectious nature of malignant neoplasms. The "parasites" are certain protoplasmic bodies —when fully developed inclosed in a distinct capsule—contained in the cancer-cell; sometimes within, sometimes without, the nucleus; and resembling the spores of protozoa. Soudakevitch, Ruffer, Walker, Clarke, and others have described such elements, which they regard as sporozoa, bearing a resemblance to the hæmatozoa of malarial fever and common to almost all cancers of glandular origin. The peripheral portions of the neoplasm contain parasites of small dimensions, while at some depth from the surface are found large sporocysts. In parts which are rich with parasites karyokinesis is wanting or is little marked; on the other hand, in parts where the proliferation of the tissues is active the parasites are wanting or are few in number. This shows that they live but in tissues whose vitality is low. Arguments were advanced to prove that these bodies were not degenerate cell-nuclei. Pio-Foá claims to have followed all the stages of development from a little corpuscle the size of a nucleolus to the sporocysts as large as a full-sized cell-nucleus. Thus far it has been impossible to obtain cultures of these parasites. Cancer is not inoculable by grafting except in individuals of the same animal species. Though parasites may be found in all tumors manifestly cancerous, they doubtless exist there in the state of spores difficult to distinguish from nuclei. These spores infect other cells, and are transported with them into the secondary nodules, where the parasite develops

anew, and where it infects other histological elements. The cells containing the parasites eventually die and disintegrate, while the surrounding cells undergo a process of active proliferation.

Cornil, of Paris, declared himself as yet far from convinced that the forms which Foá and others described are parasites. We find in cancer a great number of modifications of the form of cells and of nuclei which might easily be taken for parasites. The nuclei of cancerous cells divide sometimes into two, sometimes into three, four, or more secondary nuclei, and these divisions end in the production of two or more cells, each containing a nucleus, or in the production of several nuclei inhabiting the protoplasm of several cells. The nuclei of the cells undergoing division are small and rich in chromatic material, but they soon become fimbriated on their borders, knobbed, with predominance of liquid in their interior; they may become completely achromatic. They will then present the most varied shapes, from crescents to double sacs, crowns, small knobby or spherical masses (secondary nuclei), containing little coloring substance. These transformed nuclei sometimes present an œdematous appearance (hydropic nuclei). The result of close observation with staining methods has convinced Cornil that Foá's parasites are only metamorphosed nuclei, —a product of morbid karyokinesis. According to Cornil, they are found also in cancer-degenerated cells whose protoplasm stains red, and which contain, in place of nuclei, granules, filaments, or masses of nuclein, representing the different forms of indirect division, without the occurrence of achromatic filaments or of clear space around the divided nuclei. These are cell degenerations arrested in one of the phases of indirect division of the nuclei. Even migrating leucocytes interposed between cancer-cells have been mistaken for parasites, especially when they had retrograded and had broken up into fragments of nuclein. Duplay and Cazin, of Paris, stated that their researches on the structure of the constituent elements of epithelial cancers had led them to the same conclusions as those of Cornil. The coccidia of Foá and others are only forms of cell degeneration —products of " indirect division "—and have no parasitic character.

Ruffer, of London, spoke in support of the claims of Pio-Foá, corroborating his conclusions; while Morpurgo, of Turin, as stoutly confirmed the position of Cornil, Duplay, and Cazin; so

that the parasitic, and in particular the psorospermic, origin of cancer may be considered as still *sub judice*. We have to oppose to the weight of Cornil's assurance, that the "organisms" are simply altered histological elements, the decided opinion of Metschnikoff and Sims Woodhead, that they are "undoubted coccidia." Admitting the nature of these bodies to be parasitic, it might be claimed that they are only the accompaniments of malignant growths, not the cause. The conditions of their growth and development, according to Sims Woodhead, are: a lowered condition of the vitality of the epithelial elements in which they make their habitat; finding a suitable soil, they multiply, secrete their toxins, and, by their irritant action on the parts which they invade, resemble certain well-known pathogenic microbes, especially the Koch bacillus, in the degenerative processes and products which they entail. One extremely weak link in the chain of evidence, as Woodhead admits, is that hitherto inoculation experiments with cancerous material have very rarely been successful in producing any cancerous reaction.

Nepveu [273 Jan.,'94] expresses his conviction that amœbæ, sporozoa, and bacteria make cancer a neoplasm of parasitic nature. Bacteria play some rôle in these tumors and give rise to some part, at least, of its pathogenic action. The belief in the existence of the latter is not incompatible with the presence of protozoa. Richard Barwell [2 Sept.22,'94] shows that infection of animals or of man by protozoa may produce irritation, hyperplasia, and inflammation, though, as a rule (certainly in animals), their presence in moderate numbers is incapable of causing any disturbance whatever, symbiosis being quite established. When introduced artificially, either by way of wounds into connective tissue or by inclusion into epithelium-lined cavities, they produce merely a very slight and transient irritation (hardly an inflammation). In no single case has infection by any form of protozoa or psorosperms been found to cause neoplasms.

H. G. Plimmer [247 May,'94] declines to accept Korotneff's rhopalocephalus [2158 '93] as the parasite of carcinoma, claiming that the researches were imperfectly carried out, and that the parasites said to be found in dozens in the sections are nothing more or less than epithelioma-cells. Metschnikoff adds a note to Plimmer's article, asserting that Korotneff has mistaken the pseudococcidia for parasites, and that, as his researches are based only on one case

(epithelioma of the lip), they cannot fail to awaken skepticism. D'Arcy Power $_{v.2,p.830,'93}^{2}$ has succeeded in obtaining appearances similar to the "cancer organism" described by Ruffer by grafting cancer upon the irritated mucous membranes of animals, and which he has not yet found as a result of the simple irritation of tissues or after the grafting upon them of such normal epithelial cells as those on the anterior surface of the cornea. In the rabbit the structures resembling Ruffer's "cancer bodies" are intracellular, and are also found between the cells, but they entirely disappear within a week of the introduction of the cancerous tissue, and he has not yet ascertained what becomes of them. They are, perhaps, destroyed by the cells which they have invaded. If this be so, and assuming that such bodies are the cause of cancer,—an assumption which is still gratuitous, for it has to be proven,—we have an explanation of the inability to produce the disease artificially in animals. It may be that the "cancer bodies" are merely phases in the degeneration of cells, disappearing as the changes become more marked.

Bard, of Lyons, $_{Oct.10,'94}^{3}$; $_{Oct.19}^{22}$ believes that all the tissues of the organism may, in different degrees of frequency, give birth to cancer, and that each one of these tissues may engender a cancer special to it. It is difficult to reserve, as many authors have done, the name of cancer for tumors of epithelial structure, as, among the different kinds of cells of the normal organism, the limit of epithelial tissues is ill-defined and purely conventional. In any case, it has been satisfactorily proved that the cells of tumors preserve the attributes of the original tissues; so that it is possible to recognize the origin of a tumor by examination of its cells, which differ only from normal cells by an excess of vitality,—an imperfect and exaggerated proliferation. Degeneration sets in only when the volume of the neoplasm is out of proportion to its means of nutrition. This degeneration may be regarded as the disease of the tumor. The only true abnormal character is the extraordinary and apparently unlimited proliferation of cells, which has given rise to the theory that the cancerous cell was a parasite. It seems difficult to admit, however, that a solitary parasite could exercise such a localized and specific action in each particular case, or that it could pass through the organism to act on some distant part, leaving large tracts in its passage untouched. Consequently, in

his mind, the parasite theory is, up to the present, at least, absolutely unacceptable. Cancer is a monstrosity of cellular development, and produced by some internal disturbance of harmony.

Herbert Snow [36 Dec.,'93] gives the name of blastomata to "certain obscure and strangely-constituted tumors," often of malignant tendency, which, he says, refuse to fall into any of the recognized groups. They "all agree in being the offspring of fœtal structures obsolete in extra-uterine life," and they are further contrasted with "the non-congenital cancers of the adult" in that they appear to arise wholly spontaneously,—*i.e.*, "as the natural outcome of some inherent force or law of development,"—whereas the latter "are never found without the previous operation of one or other of certain recognizable antecedents." He expresses the belief that the career of this anomalous group of neoplasms gives considerable support to the theory of "autositic cell-reversion,"—the only general theory of cancer development which at present accounts for all the phenomena of malignancy.

Mayet, [920 v.96,p.1316; 2 Dec.16,'94] as a result of experiments as to the possibility of inoculating cancer from the human subject into animals, has arrived at the following conclusions: 1. Carcinomatous tissue from man, macerated in glycerin, forms a liquid which, introduced repeatedly into the white rat, sometimes causes the development of new growth in that animal, evidently cancerous. 2. This result is obtained only after a very long period of incubation, and is accompanied by a state of cachexia, which develops suddenly a few days before death (in a case reported, eleven months after the last inoculation). 3. When a neoplasm is not produced the animal may die from a similar cachexia coming on late, without any anatomical change visible to the naked eye. 4. This fatal cachexia has also been brought about somewhat earlier, by a single massive injection of glycerin mixed with epitheliomatous tissue from the stomach, without macroscopical anatomical change. 5. Portions of cancerous tissue from the human subject grafted into a white rat were absorbed without producing any local or general change; at least, during the six months following. Boinet, [3 Nov.3,'94] after a long series of experiments on the rat, the rabbit, and the guinea-pig, states that the histological examination of the lesions which resulted does not authorize him in pronouncing in favor of the transmissibility of cancer.

At the International Congress of Hygiene and Demography, Budapest, Duplay, of Paris, [2 Sept.22,'94] expressed the belief that recent experience pointed strongly to the view that cancer in an individual of one species could not be communicated by inoculation to an individual of another species, and that within the same species cancer could be transmitted from one individual to another only under conditions which must be very exceptional and were not yet understood, though hereditary predisposition, perhaps, played a certain part. Török, of Budapest, had satisfied himself by observation that the bodies regarded as psorosperms in cancer were nuclei, nucleoli, epithelial or migratory cells, red blood-cells, or products of degeneration.

Arloing, of Lyons, had been led by his own experiments to the same opinion as Duplay with regard to the non-transmissibility of cancer from an individual of one species to an individual of another species. They led him equally to confirm the opinion that under certain conditions cancer might be transmitted from one individual to another individual of the same species. He had seen this occur in the dog.

H. Morau [273 Sept.,'94; 2 Sept.,29,'94] has made experiments to determine the transmissibility of cancer, using for the purpose a white mouse having in the right axilla a tumor the size of a small hazel-nut, which was shown by microscopical examination to be a cylindrical epithelioma. A fragment of this growth removed with the usual antiseptic precautions was inoculated under the skin of the axilla in white mice of different stocks. The results of these experiments were positive, as was shown by the formation, at the seat of inoculation or in some other part of the animal's body, of small, hard nodules, which proved to be cylindrical epitheliomata. Further experiments led the author to the following conclusions: Heredity plays a considerable part in the development of cylindrical epithelioma in the white mouse by preparing the soil for the growth. Pregnancy hastens their evolution. They may become generalized, and generalization is hastened by injury of any kind. In proportion as they develop in new organizations they become less inoculable and less virulent. When not ulcerated they contain no bacteria, but when they do ulcerate all the micro-organisms of suppuration are found in them.

Experimental hetero-inoculation being thus an established

fact, spontaneous or accidental hetero-inoculation is, therefore, possible. It is to clinical observation that inquirers must have recourse in order to clear up the question, and false deductions are more easily avoided when these observations are made in country districts where the pathological antecedents and mode of life of the population are well known. The very unequal distribution of the disease is an extremely striking phenomenon. Thus, according to Guelliot, of Rheims, [3] Oct.10; [6] Oct.20,'94 100,000 persons in Paris or Rheims supply 100 victims, the corresponding figures for a village in the Ardennes and a district of the Aisne respectively being 266 and 1400. Again, instances have been known of the inhabitants of a particular district of a town or a group of houses being especially visited by the disease. Nay, habitations that may fitly be designated as cancer-houses have been known to exist, where three or four denizens have been successively victims of cancer. Such a case is cited by d'Arcy Power. [2] June 9,'94 Guelliot has collected 15 such examples, yielding 50 victims. It would seem that nothing short of contagion could explain the foregoing. More instructive still are examples of cancerous affections appearing successively in two persons living constantly under the same roof. Guelliot cites 103 such instances, 42 having been noted by himself. Of these 103 examples 14 had reference to co-lodgers, relatives, and masters and servants, and 89 (or more than four-fifths) to husband and wife. The transmission may be direct (through penis and uterus), but more frequently it is effected indirectly through wearing apparel or table utensils. Twice inoculation occurred through a tobacco-pipe. In more than one-half of 64 cases of *cancer à deux* the interval separating the appearance of tumors in the two persons was under two years. In 26 instances the cancer was homotopic (affecting the same organ); in 97 heterotopic. Guelliot opines that the influence of heredity is exaggerated. At most, only 12.5 per cent. come under this heading; and if account be taken of persons who, born of cancerous parents, reach extreme old age, the proportion is reduced to 5 or 6 per cent. (from the statistics of fifty old men ranging from 70 to 90 years of age). He knows of nine practitioners, attending special cases of cancer, who contracted the disease.

Critzmann [2160] '94 has observed cases in his own practice seeming to prove the hereditary character of the affection.

Treatment.—Halstead $^{868}_{v.4,No.6,'94}$ is an advocate of very thorough removal of parts adjacent to a cancerous breast when it is amputated. He lays down the following rule: The pectoralis major muscle, entire or all except its clavicular portion, should be excised in every case of cancer of the breast, because the operator is enabled thereby to remove in one piece all of the suspected tissues. The suspected tissues should be removed in one piece, first, lest the wound become infected by the division of tissues invaded by the disease or of lymphatic vessels containing cancer-cells; and, secondly, because shreds or pieces of cancerous tissue might readily be overlooked in a piecemeal extirpation. His operative technique is as follows: An incision is made around the breast, avoiding any infiltrated skin, and continued upward and outward just below the level of the clavicle to a point on the anterior surface of the shoulder corresponding to the head of the humerus. The cut is carried at once and everywhere through the fat; the skin is dissected outward and to the lower edge of the pectoralis major muscle at the position where the fat forming the superficial fascia of the chest is continuous with that of the axilla. The costal insertions of the pectoralis major muscle are severed, and the splitting of the muscle, usually between its clavicular and costal portions, is begun, and continued to a point opposite the scalenus tubercle on the clavicle, where the clavicular portion of the pectoralis major muscle and the skin overlying it are cut through hard up to the clavicle, exposing the apex of the axilla. The loose tissue under the clavicular portion (the portion usually left behind) of the pectoralis major is carefully dissected from this muscle as the latter is drawn upward by a broad, sharp retractor; this tissue is rich in lymphatics and is sometimes infiltrated with cancer,—an important fact. The splitting of the muscle is continued out to the humerus, and the part of the muscle to be removed is now cut through close to its humeral attachment. The whole mass—skin, breast, areolar tissue, and fat circumscribed by the original skin incision—is raised up with some force, to put the submuscular fascia on the stretch, so that it is stripped from the thorax close to the ribs and pectoralis minor muscle. The delicate sheath of the minor muscle is included, when practicable. The lower outer border of the minor muscle having been passed and clearly exposed, this muscle is divided at right angles to its fibres and at

a point a little below its middle. The tissue—more or less rich in lymphatics and often cancerous—over the minor muscle near its coracoid insertion is divided as far out as possible and then reflected inward, in order to liberate or prepare for the reflection upward of this part of the minor muscle. The upper, outer portion of the minor muscle is drawn upward with a broad, sharp retractor. This liberates the retractor, which, until now, has been holding back the clavicular portion of the pectoralis major muscle. The small blood-vessels under the minor muscle, near its insertion, are separated from the muscle with the greatest care. These are imbedded in loose connective tissue which seems to be rich in lymphatics and contains more or less fat, which is often infiltrated with cancer. These blood-vessels are dissected out very clean and immediately ligated close to the axillary vein. The ligation of these very delicate vessels should not be postponed, for the clamps occluding them might, of their own weight, drop off or accidentally be pulled off, or the vessels themselves might be torn away by the clamps; and, besides, so many clamps, if left on the veins, would be in the way of the operator. Having exposed the subclavian vein at the highest possible subclavicular point, the contents of the axilla are dissected away with scrupulous care, also with the sharpest possible knife. The glands and fat should not be pulled out with the fingers. The axillary vein should be stripped absolutely clean. Not a particle of extraneous tissue should be included in the ligatures which are applied to the branches—sometimes very minute—of the axillary vessels. In liberating the vein from the tissues to be removed it is best to push the vein away from the tissues rather than, holding the vein, to push the tissues away from it. It may not always be necessary to expose the artery, but it is well to do so. Sometimes the tissue above the large vessels is infiltrated. It is best to remove all the loose tissue above the vessels and about the axillary plexus of nerves. Having cleaned the vessels, the axillary contents are rapidly stripped from the inner wall of the axilla,—the lateral wall of the thorax. The mass to be removed is firmly grasped with the left hand and pulled outward and slightly upward with sufficient force to put on the stretch the delicate fascia which still binds it to the chest. This fascia is cut away close to the ribs and serratus magnus muscle. When the junction of the posterior

and lateral walls of the axilla is reached, or a little sooner, an assistant takes hold of the triangular flap of skin and draws it outward to assist in spreading out the tissues which lie on the subscapularis, teres major, and latissimus dorsi muscles. The operator, having taken a different hold of the tumor, cleans from within outward the posterior wall of the axilla, thus rendering easy and bloodless a part of the operation which used to be troublesome and bloody. Each bleeding-point is stopped as quickly as possible with an artery-forceps. The edges of the wound are approximated by a buried purse-string suture of silk. The triangular flap of skin is used as a lining for the fornix of the axilla; hence the apex of this flap is shifted to a new and lower position. The axilla is never drained and invariably heals by first intention. The uncovered wound often heals by the so-called organization of the blood-clot. As to the possible disability produced by the operation, it is in most cases so slight as to be absolutely inappreciable. In the majority the arm of the side operated upon has been quite as useful as before the operation. Halstead claims excellent results: 76 operations (complete and incomplete) for breast cancer have been performed in the Johns Hopkins Hospital from June, 1889, to January, 1894, and not one death resulted from the operation; 26 of the operations were incomplete. Of the 50 which were complete, local recurrence occurred only in 3, or in 6 per cent.,—the lowest known record.

In 118 cases treated by Wm. T. Bull $\frac{59}{\text{Aug. 25, '94}}$ the diagnosis was confirmed by microscopical examination in every instance except one, and only three of the patients were lost sight of. All of the cases were not available as contributing to the question of cure, because not all the operations were complete or radical in character. Ten incomplete operations were performed, the breast only being removed. These were all followed by recovery. One hundred and eight complete operations, in which the breast was excised, together with a liberal amount of the skin over it, the fascia of the pectoral muscle, and the glands of the axilla, included four fatal results. This gives a mortality percentage of 3.6 per cent. The author, in determining the proportion of cures, accepts the three-year limit as evidence of cure, and deducts the 30 cases that were operated on subsequent to 1891, with the 3 cases lost sight of. Of the remaining 85 cases 16 were alive and in good

health on January 1, 1894, and have lived on an average six years and a few days since the operation. This gives a recovery percentage of 26.6 per cent., which is a greater proportion of cures than has been previously reported. The 10 patients in whom only the breast was removed all died of cancer at the end of an average period of thirty-four and one-half months. The author feels convinced that the incomplete operation is utterly inadequate, and should not be performed except as a preventive measure or for the relief of local symptoms. The complete operation should be done in every case of cancer, whether the glands of the axilla are felt to be enlarged or not. He regards it of great importance to remove the parts in one solid mass from the inner periphery of the breast to the apex of the axilla. By this method the parts most likely to be affected by recurrence—the skin and pectoral fascia, the axillary glands, and the lymphatics of that region—are removed.

The following data show that the complete operation is capable of effecting a cure even when the glands are involved. Of the 20 cured cases, the breast and glands were involved in 8. Of the entire number—85 cases—the breast and glands were both affected in 46, the breast alone in 22, and the condition was not noted in 17. Of the 22 cases, 12, or 54 per cent., were cured, and 10, or 45 per cent., died of recurrence. Of the 46 cases, 8, or 17 per cent., were cured, and 38, or 82 per cent., died of operation or a recurrence, or are living with recurrence. By this method, expectation of cure may be held for at least one-half the cases of cancer if applied before the axilla is invaded. Operation is indicated in the earliest stages of the disease, and a positive diagnosis should be made, in all cases of tumor of the breast, by means of needle exploration or incision. When the operation fails to cure, it prolongs life and regulates the course of the disease so as to make it more bearable. Secondary operations are often advisable as palliative measures, and should be performed when the nodules are small and free from adhesions. The risk of the complete operation is slight, and it is followed by no undesirable after-effects.

J. McFadden Gaston, [1] Dec. 9, '93 in a paper read before the Southern Surgical and Gynæcological Association, expressed the opinion that whenever a breast was the seat of a malignant tumor, whether

wholly or partially involved, there should be no hesitation about removing the entire glandular structure. If only a part of the mammary gland seemed to be involved, and it was evident the knife could be carried outside the neoplasm into the apparently sound tissues of the breast, there was every reason to believe that if any portion of the gland was left it might become the seat of disease and that recurrence would most probably follow the operation. On the other hand, an entire ablation offered better prospects of success. The relative advantages of the knife and cauteries in the management of carcinoma depended very much upon the progress of the disease. In the incipiency of the local trouble there could be no doubt in regard to excision being preferable to cauterization; but after full development of a tumor with a tendency to degeneration and breaking down of its structure, the resort to escharotics had its advantages in extending to the remote ramifications of the disease. It was a prevalent impression that certain caustic applications attacked diseased structures without affecting the sound tissues, and that the so-called roots of a cancer were thus destroyed. There seemed to be some just foundation for this belief in regard to applications of arsenic, but the destructive effect of caustic potash, in the form of Vienna paste, extended to every vital structure with which it came in contact, and the same was true of the plaster of sulphuric acid and charcoal as an escharotic.

Raymond Johnson [6 June 23,'94] observes three points in excising a cancerous breast: (1) that the skin overlying the breast should be freely removed; (2) that the fascia overlying the pectoralis major muscle should be freely removed; (3) that the peripheral parts of the breast should be freely removed. H. O. Marcy, of Boston, [80 Aug.15,'94] in a discussion on the subject before the American Medical Association, stated that caustics simply made an open wound, liable to further infection, and that he had obtained far better results from local operations by the use of the knife, carefully eliminating the tissue wide of the area of disease, so far as we can ascertain its position. Shiels called attention to the fact that, when we apply a caustic, no matter how slight or how strong it may be, with the hope of curing a malignant disease, we are applying it to a tissue which is undergoing rapid cellular degeneration, and are liable to change a non-malignant growth into a

malignant one. D. L. Cole [106 Nov.,'94] prefers arsenious paste in all cases where it is desirable to save as much tissue as possible. W. B. Coley, of New York, [5 July,'94] gives the histories of ten cases of inoperable malignant tumors and a table of forty-four cases showing the results of treatment with injections into the tumor of the products of the streptococcus erysipelatosus and bacillus prodigiosus. He formulates the following conclusions: (1) the curative action of erysipelas upon malignant tumors is an established fact; (2) this action is much more powerful in sarcoma than in carcinoma; (3) this action is chiefly due to the toxins of the erysipelas streptococcus, which may be isolated and used with safety; (4) this action is greatly increased by the addition of the toxins of the bacillus prodigiosus; (5) the toxins to be of value should come from virulent cultures, and should be freshly prepared; (6) the results obtained from the use of toxins without danger are so nearly equal to those obtained from an attack of erysipelas that inoculation should rarely be resorted to. Similar conclusions are advanced by Wyeth. [61 June 30,'94] The method has also, according to an editorial writer, [80 Aug.15,'94] been tried to a very considerable extent in Philadelphia, with results by no means as encouraging as those reported by Coley. It has been found to produce either no favorable influence or, in other instances, the development of a high fever and other symptoms of reaction following the injection have so increased the patient's discomfort and sapped his strength that it has seemed as if the treatment actually hurried the patient toward his end. In two cases of osteosarcoma in which the toxins were employed, in which condition, by the bye, Coley also expresses doubt of their value, no favorable action was discoverable; in fact, they did harm rather than good. The question as to the real value of this method of treating cases which, under ordinary methods, are absolutely helpless, is still, of course, open to debate. The fact, however, that all such cases have been considered hopeless, and that Coley has reported recoveries in some instances, is worthy of consideration.

Griswold [80 Aug.15,'94] describes his method of applying caustics in epithelioma on the face, hand, or lip, where the patients refuse to submit to the knife. The caustic is made of sulphate of zinc, dried so that the water of crystallization is all driven off by heat till it bubbles up, and then powdered in a mortar promptly and

quickly, so that it does not absorb water from the air; it is put in a bottle and enough chemically-pure sulphuric acid poured in to make a paste so thick that when a little stick or little glass rod is put in it a good-sized drop will adhere. It is applied, on plenty of absorbent cotton or plaster, over the entire surface. It is a little painful, but in about ten minutes it destroys the tissue to the depth of about one-eighth of an inch. With the point of a penknife it is then scraped off to the quick until it begins to bleed, and again applied; and, after four or five applications, the physician must use his judgment as to whether he has got all the cells or not. Griswold has met with but one failure in twenty operations. An hour and one-half or two hours may be required, according to the size of the epithelioma. Any simple ointment is afterward applied.

SURGICAL TUBERCULOSIS.

Teale [2] No. 1717, '93 lays down the following rules for the treatment of cervical tubercular adenitis: 1. Whenever fluid—that is, pus—can be detected in connection with a diseased lymphatic gland, the operation should be done before the skin becomes red and thin. 2. When the diseased gland is subcutaneous—that is, not beneath the deep fascia or muscle, and has been completely removed—the least scar will result if neither stitches nor drainage-tube be used, especially if it be possible to leave the wound uncovered by dressing and exposed to the air, so that the edges may be drawn and glued together by drying lymph. 3. If the diseased gland be beneath the muscle or muscular fascia, then a drainage-tube must be used and the edges of the wound must be united by suture. The best drainage-tube is the gilt spiral wire, especially as it may have to remain from two to eight or ten weeks, according to the depth of the wound or the completeness of the removal of the gland. 4. Where many glands have to be removed, it is better to remove them through a series of small incisions and thereby avoid very extensive ones. Considering the subject from a pathological point of view, he holds that all sinuses and suppurating cavities should be thoroughly cleansed by means of scraper and lint, so as to leave a fresh surface free from granulation or decayed or decaying tissue, and that a drainage-exit should be maintained until all the deep parts are healed. W. K. Treves, in the discussion, stated that it was important to avoid tearing or

wounding the gland in removing it, to keep close to its surface in order to prevent hæmorrhage, and to use transverse incisions. Godlee advocated small, free incisions and complete removal, as did Marsh and Noble.

Dollinger [336 No.36,'94] recommends subcutaneous extirpation of tubercular lymphatic glands of the neck. He shaves the hair from the lower portion of the back of the head, and carefully cleanses the entire head and hair, making a curved incision beginning on a level with the external auditory meatus, one centimetre from the edge of the hair, curving about five centimetres in length, convex below, extending to the middle line of the neck, and carried through the fascia. He then works his way with the finger and periosteal elevator beneath the skin till the first gland is reached; this he seizes with a volsellum forceps and dissects away with the finger and elevator. The head is turned to the affected side during the operation, and any gland attached to the jugular vein is brought to the external wound and carefully removed. Brault [211 No.10,'94] also advises immediate excision of the infected glands in tubercular inguinal adenitis.

Raboul [336 No.11,'94; 80 May 15] warmly commends camphor-naphthol in the treatment of tubercular adenitis. In some reported cases the favorable results were the most striking; in others abscess and fistula followed. It is claimed in favor of this method that there is no danger of intoxication and the treatment is practically painless. It must, however, be long continued. It is interesting to note that Ménard and Calot have reported cases of intoxication following injection of camphor-naphthol into abscess-cavities. The patient suffered from frequent rapid pulse, loss of consciousness, and epileptiform attacks. The quantity of the drug injected was about 6 drachms (23 grammes). This patient recovered. In another case, 8 years of age, 1½ ounces (50 grammes) of the solution were injected. In the third case, aged 12, 5 drachms (20 grammes). In these last two cases life was saved by freely opening the cavity and washing it out on the first appearance of toxic symptoms.

Bauby, of Toulouse, [1088 Sept.30,'94] discusses the treatment of surgical tuberculosis by boiling water. Since May, 1893, Jeannel, of Toulouse, [6 Oct.27] has systematically treated cases of localized tuberculous lesions, such as abscesses, ulcers, osseous and joint troubles,

by this method. After having freely opened the seat of mischief and slit up any sinuses that may exist, he excises if the lesion involve a joint. All the caseous detritus is then removed by curetting and thorough sponging of the parts, all bleeding being arrested. Salt solution, maintained at the boiling-point in a recipient (coffee-pot) is then allowed to fill the cavity through a thick rubber tube, the cavity being filled and emptied until a sufficient degree of cauterization is affected. It will be seen that this *modus operandi* is only possible in the case of a funnel-shaped cavity whose sides can be raised and kept apart by tenacula and which is unprovided with counter-openings,—a condition frequently met with in practice. A second and preferable procedure consists in first filling the area with cold or tepid salt solution, and then raising the liquid to boiling-point by introducing into it the blade of a thermo-cautery at a red heat. One minute suffices to fill a cavity the size of a pigeon's egg with boiling water in this way. The thermo-cautery method insures a constant temperature of 100° C. (212° F.), but it is applicable only in the case of an abscess-cavity wide enough to allow the introduction of the blade without touching the parietes. General anæsthesia is, of course, necessary, except in cases of small abscesses, when cocaine locally applied is adequate. When the patient awakes considerable local pain is complained of, but this disappears the next day. The parietes of the cavity—or the abscess-membrane, as this used to be designated—becomes gray, and yields a copious secretion of serous discharge, which renders frequent renewal of dressings a necessity. In a few days a detergent process is evident, granulations develop, and cicatrization rapidly ensues. Suppuration is rare; in certain cases, indeed, primary union is obtained. The boiling-water method is superior to ordinary cauterizing procedures in that it softens, disintegrates, and sterilizes the tissues to a greater depth.

Riedel [226 B.47,Nos.3,4] has observed three cases of persistent œdema and elephantiasis following the extirpation of lymphatic glands, and Binet [212 Dec.10,'94] a case of angina after removal of the glands of the neck.

ABSCESS.

Nobl [28 B.27,H.1; 80 June 15,'94] reported to the Vienna Dermatological Society the results of his investigations into the method of treating vene-

real lymphadenitis proposed by Lang, which is as follows: The abscess is punctured with the point of a bistoury and the contents evacuated by moderate pressure. The cavity is washed out with a 1-per-cent. solution of nitrate of silver driven in with some pressure. This solution is evacuated through the puncture and pressure-bandages applied. In very large abscesses two puncture-points are made, more efficient drainage being thus secured. This treatment of puncture, evacuation, and injection was continued two or three days, until there was no further secretion, usually requiring but two injections. At first, after treatment, there is a thick, chocolate-colored exudate; finally, only blood-stained serum escapes on puncture, and this, if it persistently accumulate, may often be left to absorption. When a case was presented in which abscess-formation was not complete, showing uncertain fluctuation, the injections of nitrate of silver were forced not only into the cavity left by partial evacuation of the pus, but also in the surrounding infiltrated tissue. This causes, in two or three days, a painless softening of the diseased glands, or even brings about a more favorable result,—*i.e.*, prompt resolution of the inflammation. The treatment is contra-indicated in the strumous form of buboes, which require radical operation. In seventy cases treated according to the method just detailed the average period of healing was ten days. In eight cases healing occurred in from three to five days. In eight cases cure was not accomplished for twenty-five to thirty days. In the great majority convalescence was complete in from five to ten days.

Kahane $\frac{113}{\text{No.1,'94}}$ used teucrin in a case of chronic abscess of the back of more than nine weeks' standing. The abscess-cavity extended from the lower cervical vertebræ right down to the sacrum, and gave a marked fluctuation. Three injections of a gramme (15½ minims) each were made. After each injection there was a rise of temperature and some constitutional disturbance. Three days after the last injection the abscess-wall was incised and about 2 litres (quarts) of pus were evacuated. The abscess then steadily healed, and after about a month the cavity had become almost entirely obliterated, the only trace of it being a sinus, about an inch deep, secreting a serous fluid. The tuberculous character of the abscess had entirely disappeared.

ANTHRAX.

Sanarelli $^{262}_{\text{Dec.,'93}}$; $^{2}_{\text{Mar.10,'94}}$ combats the view of Pekelharing, who holds that the blood has a bactericidal power over anthrax spores; and not only the blood, but even the subcutaneous lymph. Sanarelli introduced small collodion tubes, containing anthrax spores, under the skin of rabbits, observing that the lymph gradually penetrates through their walls and bathes the spores. These latter germinate and form a rich culture of asporogene bacilli possessed of great virulence. After a few days, however, whether through failure of nutritive material or from excess of metabolic products, the development of the bacilli ceases and they gradually degenerate and die, as they would do in any other nutritive medium. The author maintains that, on the whole, his views are consistent with those held by Metschnikoff. Grammatchikoff $^{262}_{\text{Dec.,'93}}$ finds, from experiments similar to those of Wooldridge, Wright, and others, that thymus and testicle juices have no immunizing effect in anthrax. A. F. Matveieff $^{696}_{\text{Dec.,'94}}$ reports 29 cases of anthrax admitted to the Riazan Zemsky Hospital during 1890–'94. Of the number, 24 were treated by Jarnvosky's method,—that is, by subcutaneous injections around the pustule of a 2- or 3-per-cent. carbolic-acid solution (three Pravaz syringefuls three times daily), with compresses soaked in the same solution. Seventeen of the patients recovered, 7 died. All the fatal cases were first seen after all symptoms of profound systemic poisoning had already developed, some of the patients being brought to the hospital moribund. The remaining 5 were treated by excision of the pustule, with subsequent cauterization with Paquelin's instrument. All of them recovered. Sestini $^{376}_{\text{Feb.1,'94}}$; $^{2}_{\text{Mar.24}}$ reports a case successfully treated by a method first adopted by Mafucci,—namely, by the injection into the affected parts of rather large quantities of phenol solution. On the first day eight injections of 1 gramme (15½ minims) of a 3-per-cent. solution of carbolic acid were made into the parts attacked. On the second day three injections of a 2-per-cent. solution, and on the third day two more injections of 3-per-cent. solution were made into the freshly-œdematous parts. The lesions were covered with sublimate dressings, and phenate of quinine was given internally. Notwithstanding the large amount of quinine taken there was at no time any sign of carbolic-acid poisoning. One more interesting point about the case is the result

of bacteriological investigations, which showed that the anthrax bacilli did not get into the general circulation, but remained confined to the parts immediately surrounding the original point of infection.

ACTINOMYCOSIS.

Max Wolff [69 Mar.1,8,'94] states that he had previously inoculated actinomycosis in animals with success, but that, unlike actinomycosis in man, the tumor had always remained limited to the peritoneal cavity. It was impossible to cause a general infection. He had, however, now succeeded in one case, the animal living a year and one-half after inoculation. He had found in the liver a soft, lardaceous tumor, of the characteristic deep-yellow color. A case of actinomycosis, recorded by E. Lyman Brown, of Chicago, [1052 Oct.,'94] occurred in a man who had been working in a machine-shop for the past three years and had never lived on a farm or had anything to do with animals. No raw meat had been eaten, but the patient says that he always took Bologna sausage for his noon lunch. A severe lancinating pain began in a decayed tooth and soon spread over the side of the head. This was followed by a swelling situated about one-half inch below the angle of the mouth, which soon became half the size of an egg. In a week from the onset he took to his bed. A poultice was applied to the tumor until the abscess opened externally and considerable pus was discharged. Ten days later a second and soon after a third tumor appeared. When the writer first saw him these two had been poulticed and were evidently filled with pus, but had not opened. They were surrounded by a reddened, indurated area, and the pain and difficulty in swallowing showed that the tongue and the pharynx were also swollen. From the location, the absence of pain and of lymphatic enlargement, the author believed it to be a case of actinomycosis, and his diagnosis was confirmed by S. P. Black, who found yellowish-gray granules which showed under the microscope the radiated structure of the ray-fungus. The abscesses were opened and washed out daily for a week with peroxide of hydrogen and perchloride of mercury, and 10 to 15 grains (0.65 to 1 gramme) of iodide of potassium were given internally. In a week he was able to walk about, and in two weeks after beginning treatment went to his work. The area of induration gradually disappeared, and the patient gained

in flesh and strength as soon as the difficulty in eating had been overcome. The author attributes his improvement to the iodide-of-potassium treatment. Netter [164 No.46,'93] reports a case cured by the same agent given in full doses. It probably acts by increasing tissue resistance.

SURGICAL DISEASES.

By LOUIS McLANE TIFFANY, A.M., M.D.,

AND

RIDGELY B. WARFIELD, M.D.,

BALTIMORE.

TETANUS.

Nicolaier's bacillus is now generally regarded as the invariable cause of tetanus. As described by many observers, the germ is a short rod of the shape of a pin or brush, spore-bearing, growing best at a temperature of about 100° F. (37.7° C.), and only in the absence of oxygen, and widely distributed in the superficial dirt of streets and the soil of fields. It gains entrance into the body through a wound, sometimes undiscovered, and, once admitted, does not tend to become generalized, but remains for the most part about the invaded area. Thus tetanus does not depend on the development or dissemination in the body of its essential germ. Nicolaier's bacillus is a disease-producer, because in some way it creates in the tissues certain soluble substances which are toxic, and to which, on absorption, the characteristic symptoms are due. While in a measure understood, the exact nature of the actual poison has yet to be determined. Indeed, the most important problems of the day concerning this disease refer to the cause, nature, and mode of action of its peculiar toxin, together with the always interesting investigations on immunity, and on the possibility of curing the developed disease by the use of certain much-discussed serum inoculations or prepared antitoxins. Although but little progress toward the solution of these problems has been made during the year, a number of recent observations deserve mention. Among the most active experimental investigators in this field are Courmont and Doyon, of Lyons. In a recent paper, $\frac{92}{\text{Jan. 10, '94}}$ assuming that the bacillus of tetanus acts only by its secretions, and that it is quite possible to isolate perfectly-soluble products from the cultures of the germ, which, on inoculation,

produce death by tetanus, these observers announce that the produced muscular contractions are the result of an irritation to the peripheral terminations of sensitive nerves, but deny that the substance extracted from the cultures and precipitated by alcohol, the direct product of the bacillus, is the active symptom producer. They claim that the so-called tetano-toxin does not contain the tetanizing substance, but rather a ferment capable of manufacturing that substance in the economy; that is, that the culture-filtrate is pathogenic not because of toxic, but because of zymotic, properties. For this reason there exists a chemical phase between the advent of the microbic products and the disease symptoms; for, although, for example, a fraction of a drop of the filtrate is not sufficient to produce direct tetanus in a guinea-pig, it is quite enough, acting as a ferment, to produce, in the guinea-pig, the real toxin which will cause the disease. Tetanus, then, according to these authors, becomes a sort of auto-intoxication, following a special fermentation of certain tissues, caused by the soluble ferment elaborated by the bacillus of Nicolaier.

These theories have been well supported by an elaborate series of experiments. For example, the authors claim that, if the culture-filtrate act by reason of its toxic properties, it should, when injected, act promptly in a manner not unlike strychnine. This is not the case, for, in different animals, following inoculation under the skin or into the muscles, a considerable period of incubation is constantly noticed. A single case of accidental inoculation in man evidences the truth of this statement, the disease only developing after four days. Again, if the filtrate carry the active poison, it seems apparent that large injections should act more promptly and more potently than small; but this is not found to be the case, even enormous doses failing to produce immediate symptoms. Another proof of the theory is the fact that in the frog it is found that certain low temperatures check the action of the injected filtrate. This should not be the case with a direct poison, but might easily influence a process of fermentation. Other experiments are detailed, to demonstrate (1) that the actual poison does exist in the blood of an animal with tetanus, and that inoculation of such blood into a healthy animal may produce the disease without a period of incubation; (2) that the tetanizing substance might be found in the serum of the affected animal, but inconstantly and

temporarily; and (3), especially, that a soluble substance closely resembling strychnine in its action may be extracted from the muscles of the dog and rabbit suffering from the disease.

As might be premised, a further result of these observations is that the real action of the immunized blood-serum against tetanus is antifermentative, not antitoxic. If antitoxic, it should be found potent against the developed disease and at any stage. This does not seem to be true, for while the antitetanic serum will destroy the microbic products *in vitro* and will prevent tetanus, if used before the disease inoculation or immediately thereafter, it is far from proven that it can cure the disease after a certain time has elapsed, and when muscular contractions have appeared. The later publications of Behring and Kitasato and those of Roux and Vaillard and Tizzoni and Centanni are interpreted, perhaps rather freely, as giving support to this statement. In accordance with the findings of other observers, the actual tetanizing substance is declared to be an albuminoid body (toxalbumin), not an alkaloid, which has all the properties of a diastase, and which closely resembles the poisoning principle in diphtheria. Finally the recent work of Uschinsky $\frac{50}{\text{Sept.9,'93}}$ is quoted as confirming their demonstration that the product of the bacillus of tetanus is of the nature of a soluble ferment.

These experiments of Courmont and Doyon, elaborate as they are and with most suggestive deductions, can, unfortunately, not be accepted as conclusive. The work of other observers must be considered. A notable criticism on the later investigations of the toxic principle of tetanus comes in a publication from Brunner. $\frac{126}{\text{July 15,'94}}$ The conclusions of Autokratow and of Buschke and Œrgel are in entire accordance with the results obtained by the authors' experiments, as tending to establish the fact that the tetanic poison acts directly on the medullary-nerve centres, putting them in a state of abnormal excitation, but not directly provoking muscular contractions. For these an excitation of the sensitive nerves running to the cord is also required. The author accepts, also, most of the conclusions of Courmont and Doyon,—viz., that the tetanic poison has no direct action on muscular fibre; that the muscles have to be completely supplied with their nerves to be susceptible to the action of the poison; that this poison acts neither on muscular fibres nor on motor nerves; and that the

contractions are reflex, produced by the action of the poison of tetanus on the peripheral extremities of sensitive nerves. To this last formula only is exception taken, the author claiming that Courmont and Doyon have not proven that the action of the poison is not directly on the medullary-nerve centres. The foregoing experiments of Courmont and Doyon, tending to prove that the substance produced by Nicolaier's bacillus was a true ferment, and that one might isolate the real poison of the disease from the muscles of the tetanized animal and with it produce immediate tetanus on inoculation, without incubation, were submitted by Brunner to review tests, and he was only able to obtain negative results.

The domestic fowl has heretofore been considered as not susceptible to the poison of tetanus, although Vaillard has shown that, by inoculation, the blood may acquire immunizing properties. However, according to a report, Courmont and Doyon $\frac{14}{\text{Oct.22,'93}}$ have succeeded, by using very virulent injections, in producing the disease in the fowl. The period of invasion was found to be longer than is usual and the dose required to produce symptoms larger, but otherwise the disease was quite characteristic and typical.

The example of inoculation tetanus in man already incidentally mentioned deserves additional comment. The case was unmistakably one of tetanus, and followed the accidental injection of a minute quantity of the soluble products of the bacillus. The quantity injected was so small as to be inappreciable, but of an extremely active culture, 1 cubic centimetre (15½ minims) of which caused the death of a rabbit within thirty-six hours and after an incubation period of less than twenty-four hours. The case is reported by Nicolas, of Lyons, $\frac{14}{\text{Oct.25,'93}}$ himself the subject of the inoculation, and is of unusual interest, being the first recorded as occurring in man. The wound consisted in a tolerably-deep puncture in the hand from the needle of a syringe which had been used by Courmont and Doyon in tetanizing fowls. Following the inoculation four days elapsed without symptoms, and then local contractions developed. These were, at first, slight and, for a time, stationary; but after eight days they became accentuated, and then generalized, with trismus and wide-spread involvement on slight excitation. There were marked symptoms of spinal-cord congestion and great sensibility to cold in the later stages of the disease, but no elevation of temperature at any time. The general con-

tractions lasted for forty days, leaving the disease localized in the hand for some time longer. Finally recovery resulted with chloral and quiet as the principal agents in treatment. The report emphasizes the fact that the disease produced artificially in man runs a course quite parallel to inoculation tetanus in all the other animals, including the necessary incubation period, followed by local and then general symptoms. Courmont and Doyon's soluble-ferment theory is indorsed by the reporter.

A somewhat similar accident, but one much less definite, happened to Buschke, of Berlin, $\frac{69}{\text{No.50,'93}}$ who, after injecting a mouse suffering from tetanus, immediately pricked his finger with the needle of the syringe. The wound was at once extended and disinfected, and four days later an injection of Behring's serum was made. Two days after this symptoms of tetanus developed, ending finally in recovery. In this case, according to the report, the symptoms may have been caused by some irritating matter in the serum, or may have resulted from a real attack of tetanus, which was controlled and diminished by the injected serum.

After all, the point of chief interest in the study of this formidable disease turns just now on the value of the so-called immunized blood-serum as a curative agent. There are various methods of obtaining this serum. In one way or another virulent cultures of the bacillus are attenuated by treating with iodine, by filtering, or by subjecting them to certain high temperatures, and, as a result, a new liquid is procured, which, injected into different animals under favorable conditions, renders them, for a time, refractory to the most virulent inoculations. The important fact is that the blood-serum of these animals becomes, by this treatment, antitoxic for other animals very susceptible to tetanus, not only rendering them immune to subsequent inoculations of the virulent cultures, but also to those made simultaneously. For the preparation of the serum different animals have been employed, especially the horse, the dog, and the rabbit. The power of the serum to confer immunity is not always the same, but varies considerably under different circumstances, and seems greatest in those animals which have received the largest doses of the poison.

Large numbers of observations have been made on these studies of immunity, and of serum preparation, the most noteworthy, perhaps, being those of Tizzoni and Centanni. $\frac{589}{\text{p.250,'93}}$ These

investigators are indefatigable, and have published, in the last few years, many papers on a variety of experiments. It is very difficult to estimate the therapeutic value of the antitoxin injections, although the possibility of producing an immunity against tetanus has been abundantly demonstrated. This much is certain,—that, for any curative effect, vastly greater quantities of the serum must be used than are necessary for the production of immunity. According to Tizzoni and Centanni, from 1000 to 2000 times the quantity required to produce immunity before infection is needed to prevent the disease after infection, and, if the disease is well developed, at least 150 times as much as is needed in the first stages. These observers think that this is explained by the reason that the injected serum has no effect on the symptoms existing before the treatment, which tend to augment rather than otherwise, but that it tends to localize these symptoms, opposing their extension and preventing the invasion of tissues not involved. When an amount of antitoxin is used larger than is required to effect a cure, the disease processes may be in some measure hastened and their virulence lessened. The activity of the serum depends on the amount of contained antitoxin, not on different degrees of activity in the antitoxin itself, and different species of animals have serum of equal value if the amount of antitoxin is the same. Because of the large quantities of serum required in cases after infection, and because of the instability of the solutions of antitoxin, many attempts have been made to obtain from the serum its essential vaccinating principle. This has been accomplished by Tizzoni and Centanni by at least two methods. In one of these the substance is precipitated by the employment of absolute alcohol, and, except for some difficulties in the subsequent solubility of the product, is satisfactory enough; but latterly a better method has been adopted, in which the whole of the serum is subjected to a drying process at certain low temperatures and in a vacuum, the antitoxin being separated as a yellowish, scaly powder. As thus prepared, the antitoxin is nothing more than the antitetanic serum obtained in a dry condition. It is aseptic, and is entirely staple if not brought into contact with moisture. The tube containing it should only be opened when the injection is to be made, and, as a solvent, distilled water, sterilized and cooled, is to be used in the proportion of ten parts by weight to

one of the dried serum. Prepared after Tizzoni's method, and from the serum of the horse, antitoxin is now on the market, on the Continent and in England, in tubes containing 4.5 grammes ($1\frac{1}{8}$ drachms). This quantity, according to Tizzoni, is about the minimum dose curative in man. Unfortunately the drug is very expensive, costing about five dollars a gramme ($15\frac{1}{2}$ grains).

In one of their most recent communications on the vaccination of the horse against tetanus, Tizzoni and Centanni $\frac{4}{\text{Aug.6,'94}}$ have reconsidered the important point demonstrated by Behring, that while, after about a year, an immunized animal loses none of its immunity, its blood-serum becomes markedly weakened in antitoxin, containing only about $\frac{1}{100}$ the first quantity. If this were inevitable the preparation of antitoxin would be greatly hindered. As the result of their labors, these observers announce that by allowing the immunized horses long intervals of rest between bleedings, and by using certain re-inforcing injections of virulent cultures into the subcutaneous tissues, instead of into the blood-vessels, they could obtain a serum very rich in antitoxin. Marked local and general symptoms followed the re-injections, lasting about a week. The blood abstractions were not made until after an interval of about twenty days.

As the result of some work on the changes in the nerve-cells from experimental tetanus, Beck $\frac{1130}{\text{B.11,p.345,'94}}$ has produced an elaborate paper which deserves mention. He announces that definite changes in the ganglion-cells of the cord follow the action of the poison of tetanus. His work was controlled by repeated observations on the normal cord, the cells of which are said to have wide variations in their coloring capacities and in their arrangement of chromatics, protoplasmic granules, and nucleoli. The experiments were all made on the rabbit. In the hardened cord of this animal, dying four days after inoculation with a culture of the tetanus bacillus, marked effects in the ganglion-cells were noticed. The general appearance and contour of the cells were preserved, but the arrangement of the protoplasm structure and nuclei was distinctly altered. These changes were noticed as passing from the periphery of the cells toward the centre,—a condition explained by the fact that the poison, being present in the pericellular spaces, would naturally attack the circumference of the cells first. The discovered changes were most obvious in the lumbar cord,—the por-

tion nearest the inoculation point in the hind leg of the animal. It was observed that the activity of the poison on the cells continued even after the death of the animal. An editor, $^{814}_{\text{Sept.,'94}}$ commenting on Beck's paper, says that only recently have staining methods been such as to enable demonstrations of actual changes in the ganglion-cells from the various poisons, and cites Golgi's paper $^{4}_{\text{p.326,'94}}$ on rabies and Beck's on tetanus as "striking examples of how definite, and in a measure characteristic, the cell-body and nucleus of the ganglion-cells are invariably affected by the poisons or tox-albumins of these two diseases." Hodge's paper on the changes in the ganglion-cells, due to functional activity, is also mentioned as the pioneer work in this direction.

Fermi and Pernossi $^{58}_{\text{B.16,H.3,'94}}$ record the results of some experimental observations on the poison of tetanus. They agree with Kitasato that the blood-serum of different animals does not affect the poison. Neither does egg-albumen, nor do any of the extracts made from the organs of animals. The bile, urine, saliva, and pancreatic juice are all without destructive action. Gastric juice does destroy it, as will also the direct sunlight after about eight hours' exposure. Various microbes do not affect it. In the body of the fowl it may remain active for seven days, and in dried meat, or in meat preserved in glycerin, for as long as two months. The poison of tetanus is not active when introduced by the mouth or rectum, and is not absorbed by the unbroken surfaces of either mucous membrane or skin. In these reports the whole subject has been very elaborately treated.

Kartulis $^{126}_{\text{July 15,'94}}$ announces that the poison of tetanus may be found constantly in the blood of animals or man affected with the disease, but that it is only to be discovered in the urine under certain abnormal circumstances, as, for example, when enormous quantities of the culture-filtrate are employed. He regards its presence in the urine of man as indicating a very grave prognosis. In cases of doubtful diagnosis he recommends the inoculation of a little of the blood into white mice.

In Italy especially, on the Continent generally, and in England as well, a considerable number of cases of tetanus in man have been submitted to treatment by antitoxin. These cases have been, for the most part, widely published as favorable or not to the injection treatment, and have been noted with the greatest interest

by the medical world. While immunity production cannot be doubted, the value of the serum product, whether prepared by Behring, Tizzoni and Centanni, or anybody else, while probably considerable and certainly logical as curative agents, has still to be defined. A point that does seem established, however, is that in any event the curative value of serum is vastly inferior to its immunizing value, and that, in order to hope to cure the disease once developed, enormously-greater quantities of the serum are required than would be necessary for the production of immunity. As a summary of this treatment Remesoff and Fedoroff, $\frac{50}{\text{Jan.23,'94}}$ comparing two cases which they have observed with the various ones reported by Gagliard, Schwarz, Tizzoni, Rénon, Roux and Vaillard, and others, formulate four groups, including all cases: 1. Those in which the symptoms of tetanus are immediately lessened and progressively disappear after the injection. 2. Those remaining for a time unchanged, ending finally in recovery. 3. Those in which, after injection, no additional muscles are involved, but in which, nevertheless, certain accentuated symptoms may occur. 4. Those in which, in spite of the inoculation, death follows. Commenting on these formulæ it is stated that the serum inoculation notably lessens the duration of the disease; that it almost always ameliorates symptoms; that it reduces temperature, produces calm sleep, slows the pulse, and scatters and diminishes the force of the contractions.

HYDROPHOBIA.

Current literature on hydrophobia, while abundant enough and varied, is remarkable for neither originality nor precision. Because, no doubt, of the much richer returns for parallel work on other infectious disorders, the subject does not seem to have received during the year its usual amount of scientific attention. Nevertheless, it is being constantly studied by capable scientists, few medical conditions being more persistently and more courageously investigated. Meanwhile, with the whole medical world alertly expectant for some definite information, such advance as is made seems only in a circle, and year after year, from different communities, there have been recorded almost identical opinions and discussions generally inconclusive, with assumptions and denials so emphatic and so incessant that nothing about the disease seems now established beyond its perplexity, its invariable fatality,

and the definition, given centuries ago by Celsus, that "it is the most terrible of maladies, in which the patient is, at the same time, tortured by a consuming, inextinguishable thirst and an unconquerable aversion to water." Of course, the questions of chief interest turn on the much-discussed Pasteurian inoculations. Whatever may be the final verdict as to the practical value of this illustrious scientist's methods and results against hydrophobia, his experiments in this disease, together with those on anthrax and chicken-cholera, may be accepted as constituting the essential groundwork of all the recent noteworthy advances in the study of immunity. Along many lines and against various diseases the possibility of the production of an artificial immunity is no longer problematical, but abundantly demonstrated, and the therapeutic application of antitoxins is only a logical outgrowth. In hydrophobia, however,—a disease which has perhaps received more consideration than others, more than its relative importance would seem to justify, and, for many reasons, a most promising field for research,—much has been shown possible, but nothing has been proven, and all its principal problems remain unsolved.

However absurd and unsubstantiated may be the claims of some of the advocates of Pasteur's methods, the unprejudiced reviewer can hardly fail to be persuaded that, among the uncertainties, some fundamental truths have been developed. For example, experimental rabies in animals cannot be denied, and, by subdural inoculation practiced on rabbits with particles of the spinal cord from dogs dead from the disease, Pasteur succeeded not only in producing the disease, but, by a series of inoculations from animal to animal, demonstrated that the virulence of the poison became increased until the death of a rabbit could be brought about with certainty in seven days. In this way his fixed virus was obtained. Not less certainly has it been, time and again, shown that the cord of such an animal, if kept in dry atmosphere and at an even temperature of 68° F. (20° C.), would gradually lose its virulence, day by day, until, after fourteen days, it became innocuous on injection. At this time, however, a new potency in a new direction was established. No longer toxic, the cord-material became protective and produced immunity in the animal against even the most active virus. From this proceeds the well-known application, by the so-called intensive method, of protective inoculation against hydro-

phobia in man. Beginning with material (a triturate of the cord-substance in sterilized bouillon) from cords subjected to the drying process for fourteen days, subdermatic injections were practiced on individuals bitten by rabid animals and repeated daily, passing steadily from weaker up to stronger cords, from longer to shorter desiccations, until finally, after about fifteen days, the cord of only three days' drying was used and the treatment concluded.

As thus summarized, the Pasteurian method was inaugurated in 1885, and, while it has been, to some degree, elaborated and improved, it remains in its essential features practically unchanged. Acting on the theory that, by a process of gradual accommodation, the organism is enabled to resist the virus, becoming immune to its action, thousands of human beings are, year by year, submitted to the inoculations, not only in the Paris Institute, but in numerous similar establishments in various parts of the world. The statistics from these institutions are uniformly encouraging, and the death-rate, never considerable, seems, if anything, lessened year by year. On the other hand, hydrophobia is not a common disease, but rather uncommon, and, singularly enough, seems most prevalent in the very home of protective inoculation. Besides, its period of invasion is entirely conjectural, extending apparently over months and sometimes years, and then, without question, many of those bitten by undoubtedly rabid animals do not develop the infection. In addition to this it cannot be denied that hundreds of people have undergone the Pasteurian treatment after having been bitten by animals not rabid at all. Because of all of this uncertainty, a reviewal of the many-sided expressions of opinion could hardly prove profitable. No satisfactory conclusions could be adduced. Still, arguing from the published statistics, and especially from selected cases, the value of the measure seems obvious enough, although, unfortunately, it must be admitted that evidence exists to show that more than once the inoculations have themselves caused the very disease they were given to prevent.

Pottevin $\frac{262}{\text{Mar.25,'94}}$ publishes statistics, from the Pasteur Institute in Paris for 1893, showing results about as in previous years. The total number of persons in whom the treatment was concluded was 1648. Of these, 6 died from hydrophobia, but 4 only are counted failures, the other 2 having been attacked within fifteen days after the last inoculation. Excluding these, the mortality was only 0.24

per cent. It is to be noted that he excludes also 3 others in whom the disease appeared during the treatment, and still another who fell a victim after discontinuing the inoculations. The statistics for previous years, as given by Pottevin, are as follow:—1886: total number treated 2671, with 25 deaths,—a mortality of 0.94 per cent. 1887: total 1770, 14 deaths,—0.79 per cent. 1888: total 1622, 9 deaths,—0.55 per cent. 1889: total 1830, 7 deaths,—0.38 per cent. 1890: total 1540, 5 deaths,—0.32 per cent. 1891: total 1559, 4 deaths,—0.22 per cent. 1892: total 1790, 4 deaths,—0.22 per cent. In all, during the last eight years 14,430 people have been treated in the home institute, with 72 deaths,—being an average mortality of 0.50 per cent. Out of this total number of cases treated, 1213 were of bites about the head, with a mortality of 16, or 1.32 per cent; 8032 on the hands, with 45 deaths, or 0.56 per cent.; and 5185 elsewhere about the body, with 11 deaths, or 0.21 per cent. Of the 1648 cases for 1893 there were 1470 French and 178 foreigners from various parts of the world. There were only 2 cases from Germany, which raises the pertinent inquiry as to what has become of rabid dogs in that country. [22 Apr.11,'94] As a matter of fact, that empire is practically exempt from rabies because of the existence of excellent muzzling laws, the results emphasizing the value of that procedure over any sort of protective inoculation. Nocard, [208 Mar.17,'94] an able supporter of the Pasteurian method, takes this same view and advocates muzzling and high dog-tax, with the rigid suppression or destruction of stray dogs, rather than any quixotic attempt at inoculating all dogs as a protective measure.

Goldschmidt [6 May 19,'94] has published an interesting description of the rise and fall of an epizootic of rabies in Madeira, beginning about June, 1892. The disease seems never to have existed there; at least, for two centuries there had been no recorded case, although dogs were numerous, being more than 11,000, and these mostly of the scavenger order. Following the outbreak of rabies, within three months over 300 dogs had succumbed, and quite 1000 more had been destroyed as suspects. There were various cases of hydrophobia in the man, all directly traceable to dog-bites. About this time the authorities established a muzzling order and ruthlessly had destroyed every dog found unmuzzled. As a consequence the outbreak was completely stopped within six

months. The disease seems to have been imported by a dog from Spain. Goldschmidt appends the following conclusions: Hydrophobia is never spontaneous in origin; an outbreak of the disease spreads with much greater severity and with a much shorter incubation period in a country where it has been freshly introduced; all suspected animals should be examined; finally, affected dogs may recover spontaneously.

Tizzoni and Centanni, [589 Dec.27,'93] whose experiments on tetanus have attracted such wide-spread attention, have also been actively investigating hydrophobia. The chemical vaccine which they extracted from the cord-material of animals dying from the fixed virus, and which could produce immunity in other animals, even after one injection, has already been considered. Latterly they have announced some additional and most interesting discoveries. These all depend on the fruitful immunizing possibilities of blood-serum. As the result of a first series of experiments they stated that serum of immunized rabbits possessed immunizing and even therapeutic activity against rabies, and more recently they claim similar characteristics for the serum of sheep and dogs. These animals are subjected to subdural inoculations of virus, an anti-rabic value of the serum developing. This property increases, becoming more marked day by day for twenty-five days, after which time it diminishes. No ill effects have been observed as attending the injections, and the serum is without virulence. While at present these experiments can only be accepted as suggestive, they are significant, and may finally prove most important.

In some studies on the pathological histology of experimental rabies, Golgi [4 Apr.2,'94; 2 May 12,'94] describes important changes observed in the cord-structures. Up to this time it has been denied that any specific lesion could be announced as distinctive of rabies, but Golgi contends that, taken in their order of occurrence with their mode of development, the changes observed by him constitute a pathological condition characteristic of the disease. These changes were observed in both the structure of the nuclei and in the form and structure of the bodies of the cells. The cell-processes were also involved. In the nucleus certain karyokinetic phases were noted, not a true nuclear division. The cell-bodies were swollen, presenting vacuoles and bladder-like formations in the interior, while the form of the cell was also changed, with certain varicose appear-

ances of the cell-processes. In addition there was observed a granulo-adipose degeneration of the cells, which condition was also noted in the cells of the neuroglia. The process is described as a parenchymatous encephalo-myelitis, of which the exact exciting cause is as yet unknown. The nuclear changes are first noticed, sometimes as early as five days after inoculation, and associated with them is a diffuse vascular distension and leucocyte infiltration. Later the changes in the cells appear,—swelling, vacuolation, changes of form, granular appearance of nerve-cells and neuroglia, and the advanced changes in the nerve-elements.

A number of reports from the various Pasteur institutes are not here recorded, not that they are uninteresting, but because they present nothing of any new importance. For the same reason no record is made of a number of scholarly reviews and criticisms on the Pasteurian method. An elaborate review of antirabic vaccinations by Zienetz $_{\text{Sept.,'94}}^{24}$ ends with the statement that Pasteur's statistics, so far from demonstrating the efficacy of the inoculations, indicate, on the contrary, that in many cases they are pernicious, and that in most cases they are useless.

SNAKE-POISONING.

With snake-poisoning, as with the other infections, the questions of immunity are of chief importance. In a paper on the properties of blood-serum in animals immune to the venom of serpents, Calmette $_{\text{Apr.4,'94}}^{14}$ has announced the results of some important experiments. According to this author, animals may be made resistant to snake-poison either by repeated doses, at first feeble, but progressively stronger, of the venom itself, or by means of successive injections of venom treated with certain chemicals, such as chloride of gold or the hypochlorites of soda or of lime, the last procedure being analogous to that employed by Roux and Vaillard in the production of immunity against tetanus. The serum of animals so treated becomes, at the same time, preventive, antitoxic, and therapeutic, as with tetanus or diphtheria. These acquired properties are not limited in their activity to one species, for the serum of rabbits immune to cobra-poison is antitoxic to the venoms of the viper and of various other poisonous snakes. *In vitro* the antitoxic power of the serum varies according to the degree of immunity possessed by the animal furnishing

it. In his experiments Calmette made use of a serum 0.5 cubic centimetre ($7\frac{3}{4}$ minims) of which was capable of destroying 0.001 gramme ($\frac{1}{64}$ minim) of cobra-venom,—a mortal dose for a rabbit weighing 4 kilogrammes (9 pounds). Antitoxic serum may be developed in an unprotected animal by a single dose of venom not sufficient to kill, or by repeated doses of the alkaline hypochlorites in feeble quantities without the admixture of venom at all. As to its application, Calmette states that if rabbits are inoculated under the skin of the thigh with 0.001 gramme ($\frac{1}{64}$ minim) of cobra-venom, and, after an interval (one-half to one hour), subcutaneously or within the peritoneum, with serum which is protective against 0.004 gramme ($\frac{1}{16}$ minim) of the venom, the animals recover, although others not submitted to the antitoxic inoculations uniformly die after three or four hours. Even when the serum inoculations are delayed for an hour or an hour and a half after the venom injection, they are still curative, if given in sufficient doses. This limit might be extended if a more active serum were used, and Calmette has undertaken experiments on dogs, to secure the serum in larger quantities.

For the treatment of persons bitten by poisonous snakes Calmette suggests that, while waiting for the practical application of the serum therapy, the neutralizing properties of chloride of lime should be made use of. This agent is more powerful than the previously-recommended chloride of gold, and should be promptly employed in doses of 20 to 30 cubic centimetres (5 to $7\frac{1}{2}$ fluidrachms) of a freshly-prepared solution made by diluting 5 cubic centimetres ($1\frac{1}{4}$ fluidrachms) of a 1 to 12 solution with 45 cubic centimetres ($1\frac{1}{2}$ fluidounces) of boiling water. Previously-prepared solutions are not so efficacious. The injections should be made subcutaneously at a distance from the wound. Calmette found that the lime solution could always cure rabbits twenty minutes after inoculation with enough venom to kill ordinarily in two hours. Even after fifty minutes it sometimes succeeded. No ligatures or other accessory measures were employed. According to Fayrer the symptoms in man are longer delayed, giving more time for treatment, and the author concludes that, when the lime solution is employed in connection with the more powerful antitoxic serum, there should be no more deaths from snake-poisoning, except in those to whom the treatment is not available.

Ewing, [6] working in Welsh's laboratory, has performed some very interesting experiments on the action of rattlesnake-venom upon the bactericidal power of the blood-serum. In his report he cites the investigations of Mitchell and Reichert and their discoveries of the so-called toxic albumins. These observers had noticed a peculiarly-rapid decomposition of animals after death from rattlesnake-venom, which was so rapid that Formad considered the supposed bacterial multiplication and dissemination through the circulation as impossible, and suggested spontaneous generation. Welsh thought this highly improbable and advised investigation as to the possible effect of the venom on the normal germicidal activity of the serum. The experiments were conducted on rabbits with the fresh venom from a diamond rattlesnake. The serum was obtained immediately on the death of the injected animal, the slow and imperfect coagulation aiding its collection. The bacillus anthracis and the bacillus coli communis were selected to test the serum. Control experiments on normal serum were also made. Noteworthy results were obtained.

In normal serum bacterial development was not only prevented, but the number of inserted bacilli was distinctly lessened. The germicidal property of the serum only existed for twenty-four hours, after which any undestroyed bacteria were observed to multiply. On the other hand, in animals killed in one-half to three hours after poisoning with snake-venom, the germicidal power of the serum was seen to be lost, the bacterial colonies developing abundantly. A profound alteration in the blood is thus evidenced as attending inoculation of snake-venom, and the phenomenon of rapid post-mortem decomposition in poisoned animals is in this way explained. According to Ewing, the cause of many of the so-called secondary infections in infectious diseases is thus rendered clear, the primary poison, by weakening the serum resistance, encouraging the development of other disease producers.

Venomous animals seem resistant to their own poisons, and Bertrand and Phisalix [14] have suggested that this is due to absorption from the glands into the blood of enough of the poison to produce immunity. Experimentally they demonstrated in the toad's blood the essential poison of that animal, and have obtained from its blood some interesting analogous results.

SURGICAL DRESSINGS AND ANTISEPTICS.

By F. VAN IMSCHOOT, M.D.,
GHENT.

Antisepsis in Surgery.—It is scarcely twenty years ago since any surgical operation was attended with the danger of suppuration, fever, and purulent infection, and thus held in check the most eminent and skillful of operators. Pirogoff had come to take no account of the mortality, the skill of the operator, or the method of treatment in estimating the success of an operation; for him, all depended on chance. To-day, however, all this has changed, and the gravest of operations, the most extensive of lesions or mutilations, depend upon the operator and his assistants. Nothing is left to hazard, but each step is regulated methodically and scientifically. In consequence, the statistics of success increase day by day on every hand and deaths from septicæmia are exceptional. Since the cause of infection is known,—since Lister, Pasteur, and many others have shown that it depends upon living micro-organisms,—the fight has become easier. Dupuy [1088 Feb.18,'94] has devoted an extensive series of articles to the subject of antiseptics, and divides the contaminated wounds into those infected by air and those infected by direct contact. He shows that the spray is not to be recommended, as it displaces the air and thus permits septic dust to settle on the wound. The less the air of the room is disturbed during the operation, the less danger there is of disseminating germs. Terrier, [73 Nov.18,'93] in reviewing the antiseptic methods now in use, states that personally he has adopted a mixed method: that of antisepsis for the hands, asepsis in some operations and antisepsis in the greater number. Warnots [868 Oct.28,'93] advises the use of the alcohol-flame as an antiseptic for vessels necessary for operation, the alcohol being lit just before the vessels are used. The measure is, however, not applicable to porcelain or glass. He washes his hands during the operation with a sterilized 1-per-cent. sublimate solution to which 5 per cent. of tartaric acid has been

added to prevent the albuminoids from neutralizing the effect of the sublimate. He sometimes replaces this solution by one of artificial serum. He recommends the use of drainage as rarely as possible, preferring to apply tampons of sterilized gauze to the wounds or cavities for from twenty-four to forty-eight hours if necessary, followed by secondary suture. Dandois [378 May 17,'94] advocates the occlusion of small wounds (when hæmostasis is complete) by elastic iodoform collodion, 1 to 10. Buchanan [82 Sept.30,'93,et seq.] gives a complete history of surgical dressings and antiseptic methods. Hunter Robb [764 Dec.,'93] insists upon the importance of attention to the slightest details, mistakes in this direction being continually made even by the most careful operators. The word "septicæmia," or septic infection, generally comprises all lesions—local or general—which arise from the invasion of injurious germs. The symptoms are due as much to the bacteria themselves as to their toxic products. If their development is extensive acute septicæmia occurs; if the products are localized in certain organs, having been transported by septic emboli, the condition is called pyæmia. Infections partaking of both of these conditions must be classed as cases of septico-pyæmia. Under the head of local infections we, at the present day, group together all those so-called "accidents" which befall wounds: suppuration, traumatic fever, hospital gangrene, wound diphtheria, and erysipelas. All of these, though occurring much more rarely than of old, are still occasionally seen. General septicæmia or pyæmia may be set up by almost any of the micro-organisms which have pyogenic properties, *i.e.*, which are capable of giving rise to local suppuration. The organisms most frequently met with in surgical experience are: the staphylococcus pyogenes aureus, the streptococcus pyogenes, and the bacterium coli commune. Less frequently we have to deal with the staphylococcus epidermis albus, the staphylococcus pyogenes albus, the staphylococcus pyogenes citreus, the gonococcus of Neisser, the bacillus of green pus (bacillus pyocyaneus), and the micrococcus lanceolatus (diplococcus pneumoniæ).

When after an operation the patient has died without having exhibited the characteristic symptoms of septicæmia, the death is not usually attributed to septic infection, but rather to "heart-failure," shock, pneumonia, suppression of the urine, or some other more or less satisfactory cause; but, when the patient dies

even less than twelve hours after an operation, we cannot positively exclude sepsis as the cause of death until the fact has been proven by an autopsy made by a competent pathologist and bacteriologist.

Robert Reyburn [104 June 2; 144 July,'94] believes that the most favorable conditions for operation are obtained by using as little water as possible, thus removing one of the essential conditions necessary for the development of bacteria. It is practically impossible to diminish or prevent their growth in a wound by either raising or lowering the temperature of the wounded parts; hence, we can only endeavor to accomplish this object by making use of two other methods, viz., to keep all wounded surfaces as dry as possible and to exclude them from the action of the atmospheric poisonous germs during the process of repair. Of course, in operations which require the opening or removal of large suppurating cysts or cavities, it is necessary to wash them out. This should be done with fluids as near the composition of blood-serum as possible. Lawson Tait, who has nearly completed his third thousand of operations upon the abdominal cavity, uses no fluid to wash out the abdominal cavity during his operations, excepting recently-boiled water. For use in surgical operations the following fluids only are necessary, viz.: recently-boiled water used tepid (about the temperature of 100° F.—37.8° C.) and normal salt solution (0.75 per 1000, easily made by dissolving 1 ounce—30 grammes—avoirdupois of common salt in a gallon—4 litres—of boiling water). Reyburn formulates the following rules: 1. Never use a drainage-tube in a wound unless you are absolutely certain you cannot get union by first intention. 2. If you have an amputation to perform, ligate every vessel requiring it with aseptic catgut, silk-worm gut, or silk; cut the ligatures off close to the vessels and leave them in the stump; close the flaps with similar sutures, and use no adhesive plasters in contact with the flaps of the stump. 3. After you have stitched up the flaps, dust their surfaces with iodoform, boric acid, or subnitrate of bismuth. 4. Place over this a layer of iodoform gauze, then an abundant layer of aseptic cotton, and, over all this, two layers, at least, of a well-fitting bandage. 5. Above all things, never open a stump for ten or twelve or even fifteen days after an amputation, if the temperature of the patient is at normal point or even a degree

above. On the other hand, if the temperature go up to 102° or 103° F. (38.9° or 39.5° C.), open up the stump at once and find out the cause of the trouble.

Louis Frank [1 Feb.24,'94] considers the subject of asepsis with especial reference to abdominal surgery. He avoids the use of any mechanical germicide, except in the preparation of the hands; and even then he regards it as unnecessary, and often giving rise to a false sense of security, being perfectly inactive as a germicide in the solutions ordinarily used. Mechanical removal of offensive matter is the ideal method. Stuart McGuire [81 Jan.,'94] gives the details of the methods successfully employed at St. Luke's Home, Richmond, while Forgue [243 May,'94] and Franz Herzog [57 Sept.16,'94] study the subject in relation to armies stationed in country-districts.

Guermonprez, of Lille, [14 Sept.19,'94] states that truly aseptic sponges can be used without danger in surgery. The tissue of the sponge may be absorbed by the organism and no traces be left. Sponge is valuable in the treatment of ulcers of the leg, providing the surface of the ulcer be previously disinfected with care. If the dressing is not renewed until the eighth or fifteenth day, the sponge will be seen to be adherent and in part absorbed; the ulcer presents the appearance of a granulating wound and cicatrization is rapidly obtained. The same is the case in wounds of large cavities, and fistulæ do not follow if asepsis is carefully maintained throughout the treatment. In cases of pleural empyema, however, the sponge does not become absorbed and it does not adhere to ulcerating neoplasms. Thin layers appear to favor the cicatrization of extensive burns.

Sutures and Ligatures.—C. O. Thompson [99 Oct.5,'93] strongly recommends the use of horse-hair for sutures, especially where the tissues are fine and easily torn, as in the eyelid, scrotum, penis, and mucous membranes. It is flexible, easily tied, and not irritating; it can also be used for draining small wounds. It can easily be rendered sterile by placing it, for a few moments, in boiling water. Storer [99 Oct.5,'93] prefers silk-worm gut, which is also easily sterilized by exposing it to steam for three minutes. It is solid, flexible, and easily tied. According to him, horse-hair, to be sterilized, must be subjected to the action of benzin and sublimate, as repeated boiling does not always suffice. Pfaff [56 Apr.,'94] regards braided silk as the best suture, since it never provokes irritation of the

tissues. Krönig [317 July 7,'94] states that it is difficult to obtain a completely sterile and aseptic catgut. He made some experiments showing that boiling with cumol, at a temperature of 160° C. (320° F.) for one hour, was sufficient to render it thoroughly aseptic.

Périer [3 June 6,'94; 673 Aug.] calls attention to a new procedure for sterilizing and preserving ligatures and sutures, invented by Répin. This author, from numerous experiments, found that alcoholic vapor exercises a microbicide action sufficiently strong to remove any kind of micro-organism from ligatures. The most resistant spores —such as the bacillus subtilis, anthrax, tetanus, and the septic vibrion—were killed in from thirty-five to forty-five minutes by anhydrous alcohol-vapor heated to 120° C. (248° F.). Catgut is thoroughly sterilized in this way without losing any of its properties. The author places the sterilized catgut in a culture bouillon and seals it in a glass tube, keeping it for several days in an oven. If sterilization have not been complete, microbes will have developed in the bouillon and the culture will have become cloudy; if, on the other hand, the liquid remain clear, it is a material and certain proof that the contents of the tube are thoroughly aseptic.

Payne [771 No.4,'94] proposes the use of reindeer-tendons in surgical practice. They are the tendinous ends of the long muscles of the fore- and hind- legs of the deer. In preparing them for surgical use they should be treated as we are accustomed to treat the catgut, viz., soaking first in ether for twenty-four to forty-eight hours to remove all fatty material, and then preserving them in absolute alcohol, in which corrosive sublimate has been dissolved in proportion of 1 to 1000. Thus prepared they make elegant suture material, and are as readily absorbed as catgut. Should it be desirous to have the suture remain in the tissues some length of time before being absorbed, the material should be treated with a 2-per-cent. chromic acid.

According to an editorial writer, [109 Aug.,'94] the material in question was introduced by Pütiloff, some ten years ago, in Russia, where it is extensively employed.

The sterilization of catgut by boiling in alcohol presents, according to Holden, [96 May,'94] many inconveniences. He refers to the method of J. C. Schapps, of New York, [59 July 13,'89] subsequently modified, and found, from laboratory tests and clinical observation, to be both simple and satisfactory, requiring but five minutes to

render the catgut sterile. The method is as follows: The commercial catgut in coils is placed in a wide-mouthed bottle with well-fitted glass stopper (what is known as a six-ounce German XX salt-mouth is an economical size, as the internal diameter just permits the ordinary coil to lie flat) and completely immersed in stronger ether. The object of this step—the extraction of the fatty and other organic matter which would protect the microbes from the action of ordinary germicidal solutions—seems to be accomplished in forty-eight hours, but the catgut may be stored in ether for an unlimited time. When taken out it looks and feels remarkably clean, while the ether is more or less discolored and has acquired a distinctly animal odor. It is next wound on glass spools and placed in a small bottle containing an ethereal solution of mercuric bichloride (1 to 1000) and there allowed to remain until used. An advantage of this method is that, when the catgut becomes in any way infected, simply replacing it in the solution renders it soon again ready for use. Ether cannot be diluted with water, and, if it evaporate, a supply is usually at hand. Should the surgeon at any time, in case of emergency, find himself without a supply of reliable catgut, he has simply to immerse the raw catgut in the ethereal bichloride solution while other preparations for the operation are being executed. Care should be taken that the catgut, when taken out of the solution and not used, is not in any way brought in contact with aqueous solutions, as it will become softened and, if again replaced in the ethereal solution, will not regain its former strength. If the ether evaporate, more ether, and not a solution of bichloride, should be added. As the commercial sulphuric ether contains alcohol, it is essential that stronger ether be used. Otherwise, as the ether evaporates the alcohol will absorb water from the air. When the glass stoppers do not fit accurately, as is frequently the case, they may be refitted at a nominal expense. It is also a simple but valuable precaution, whenever volatile substances are to be inclosed, to put, with a small file, corresponding marks upon each bottle and its stopper. When the ether has become so contaminated as to leave a grease-spot where it touches the sides of the bottle, it must be replaced by fresh. It is available for a first bath, fresh ether being used for a second. Catgut prepared by means of commercial sulphuric ether, when exposed to the air, is moist, shiny, and soft; but when

stronger ether is used, it remains stiff and hard. It soon becomes pliable by absorption of moisture, but clinical experience demonstrates that it does not break down too soon.

Kiliani [59 May 19,'04] describes his method as follows: Dry catgut, not kept in oil, is put in absolute alcohol for twenty-four hours to remove all moisture. Then it is cut in pieces of two and three yards in length, one of which is rolled on a glass rod and put in a glass tube open at one end and with a little hole at the other, through which a short end of catgut is pulled. The glass rod is removed and the roll of catgut is in the glass tube. This tube, with its contents, is put in a second glass tube,—a little wider and longer, with one end open. Then the filled tube is put in a dry hot-air sterilizing apparatus, the temperature of which is brought up to 80° C. (176° F.) within one hour. This is to let the alcohol and what might be left of water evaporate. The open end is closed by melting the glass, and the hermetically-sealed tube is again put into the sterilizing oven, the temperature of which is brought up, in the course of two hours more, to 140° C. (284° F.), which is kept up for a whole hour. Another hour is consumed in letting the temperature gradually sink again. Then the outer tube is scratched with a file and it is ready for use. Immediately before using it the outer tube is broken at the marked place, and the inner tube with its contents put for two minutes into the solution in which the instruments are lying. Through the little hole as much as is required can be pulled out, and, if all is not used, the rest is thrown away. Each tube should contain only just about as much catgut as will be needed for an operation; for an extended operation several tubes may be opened in succession.

Drainage.—Ideal surgery would certainly seem to consist in the ability to entirely suppress the necessity for drainage, as Boeckel [168 Nov.1,'93] endeavors to show. In most cases he does away with the drain after twenty-four to forty-eight hours, applying a permanent dressing. He employs rigorous antisepsis throughout the entire operation, and avoids all unnecessary measures, such as the application of hæmostatic forceps and ligatures in such operations as resection of the knee and elbow, methodical compression and vertical elevation sufficing. He avoids the necessity for drainage by the use of a deep suture and regular methodical compression. He reports 238 cases of grave operations,—211 followed by an

ideal recovery and union by first intention, 21 by recovery with suppuration, and 6 by recovery with serous exudation.

According to Kusnezow, $^{21}_{\text{May 15,'94}}$ since the advent of asepsis, drainage is useless. It is not necessary to recovery that microorganisms should be entirely absent from a wound. The staphylococcus albus sometimes causes a slight elevation of temperature and suppuration in the line of the sutures without preventing recovery. The staphylococcus pyogenes aureus and the streptococcus are alone to be feared.

Kronacher $^{113}_{\text{No.2,'94}}$ recommends the combination of drainage with pressure first advocated by Marc Sée. An India-rubber drainage-tube introduced at the lowest part of the wound is provided with a strong silk thread near its upper end, which is brought out beneath the dressing applied over the wound. The ends of the thread are fixed in place with collodion, and a small bandage placed over all. After two to four days the small bandage is removed and the tube drawn out from the wound beneath the pressure bandage by means of the silk thread. A few turns of bandage are then placed again over the dressing.

Drainage in abdominal surgery is a disputed point, many surgeons never employing a drain, and others only when there are any doubts as to an aseptic cure. Penrose $^{19}_{\text{Aug.11,'94}}$ drains when there is hæmorrhage or septic material in the abdomen from rupture of a tubal or ovarian tumor. This he determines by a bacteriological examination of the pus.

Antiseptics.—Henle $^{41}_{\text{May 28,'94}}$ has continued the studies of Schimmelbusch, $^{336}_{\text{No.30,'93}}$ who declared it impossible to prevent septic infection on account of the great rapidity with which the virus is absorbed. Instead of confining his experiments to the most noxious germs he also made use of less virulent ones, finding that these, when introduced into wounds, died after a time. Disinfection could be effected in from two to three hours after inoculation with the streptococcus pyogenes; but eight hours after the inoculation it was impossible. His experiments indicate that antiseptics should always be employed, even if late. Messner $^{41}_{\text{May 10,'94}}$ proved by experiment that a wound inoculated with fresh human pus, or pus from cultures two days old, can be disinfected eighteen hours after inoculation by the aid of solutions of lysol or 3-percent. carbolic acid. Instead of affecting the tissues such a solution

seems to afford a resistance to the micro-organisms of suppuration. Neudörfer [57 Apr.22,'94] states that as long as the organic fluids not destined for elimination, and the morphological elements composing them, are living, they retain their normal condition without any decomposition; but the moment they die, either from too great heat or too great cold, or any other cause, decomposition may take place without the introduction of germs. If only incomplete necrobiosis occur there will be no decomposition, but transformation and the production of pus. The pus is not a manifestation of septic decomposition, but predisposes to infection. Pus may form and indicate a disease of the tissues without germs having penetrated, —as occurs in inflammations, contusions, etc., of deep tissues. If we can avoid suppuration in our operations we need not fear septicæmia. Asepsis will generally enable us to avoid the production of pus, if the organic fluids are not modified. We know the symptoms which accompany the formation of pus, and can provoke artificially several modifications of these fluids which will prevent such formation; among the means employed for this purpose are the antiseptics, though these modify the tissues. Peroxide of hydrogen, however, does not cause tissue changes, and Neudörfer has used it for the past twelve years in his surgical work, employing 1 cubic centimetre (15½ minims) per kilogramme (2⅕ pounds) of body-weight for cavities, and wiping external wounds with tampons wrung out of a 2- to 3-per-cent. solution. He prepares the region to be operated on, the hands, and the instruments antiseptically with soap and ether. No antiseptic solution is employed. The wound is compressed from a fourth to half a second with tampons of peroxide of hydrogen, the vessels tied, the wound again wiped with the tampons of peroxide, exposed to the air for a minute or two, the lips sutured, and a dressing of absorbent cotton and sterilized gauze applied by means of a bandage. The author finds that by this method the wounds do not bleed, the effect being the same as if an Esmarch bandage were applied. There is little pain following the operation and no shock; the patients are not prostrated, can eat and sleep, and cicatrization of the wound is ideal. On the third day, when the dressing is changed and the drainage-tube removed (if one has been used), no blood or pus is seen, the skin being pale and normal. The second dressing is retained until complete recovery

occurs, the suture-stitches being removed from the eighth to the twelfth day.

The successful substitution of heat for antiseptics in the preparation of instruments and surgical dressings has naturally led to the use of heat for sterilizing the wound itself. This is an ancient method. Hippocrates, Oribazius, and later writers, down to the time of Paré, were unanimous in recommending the use of the hot iron and boiling oils upon wounds. It may even be questioned if Paré did so great a service, after all, when he substituted for the cautery the use of dirty ligatures. The systematic and scientific use of heat, however, for rendering wounds aseptic is of recent date.

Phocas, of Lille, $^{59}_{\text{May 12,'94}}$ has made a particular investigation of this procedure, more especially in connection with operations for resection. He refers to the experience of Félizet, $^{908}_{\text{'92}}$ who employed the flame of a gas-jet for making the wound-surface aseptic, and to the method adopted by Dreesnau, a pupil of Trendelenburg. $^{336}_{\text{No.3,'93}}$ This surgeon poured into the cavity of the wound oil brought to a boiling-point by the thermo-cautery. In the same year Jeannel, of Toulouse, $^{100}_{\text{Nos.59,62,'93}}$ proposed to make the surfaces aseptic by touching them with boiling water. In 1892 Phocas began to employ boiling oil according to the method of Trendelenburg. At the same time he undertook, with the help of his assistant, Hennecart, some experiments to determine how much heat the living arteries and nerves could bear without disintegration. Three different methods of using heat were tested: First, cold oil was poured into the wound and then raised to a boiling-point by a thermo-cautery; second, boiling oil; and third, boiling water applied directly. It is sufficient to say that the experiments showed boiling water to be much less injurious to the tissues than the oil. Phocas finally adopted the following procedure: In osseous cavities he pours in cold oil and heats it with a thermo-cautery for three or four seconds. In other wounds, but more especially in resections and arthrectomies, he touches the wound with plugs of absorbent cotton upon which he has poured water just at the boiling-point. In this way every part of the wound is reached by water at a temperature of about 80° C. (176° F.). Each part is touched for three or four seconds and the procedure is repeated several times. Phocas states that since he

has used the boiling water his results have been "incomparably better" than formerly.

P. K. Bolshesolsky $\frac{2140}{\text{V.2,p.19}}$ strongly recommends mercury biniodide for washing out the abdominal cavity (in laparotomy), pleura (empyema), cerebral meninges (traumatic injuries), and synovial membranes (suppurative arthritis). Although he always used the solution very freely, he never saw any untoward effects, and hence considers the drug "decidedly harmless." Bolshesolsky's favorable opinion of the biniodide is shared by many Arkhangelsk practitioners. According to Hanbury Frere $\frac{1}{\text{July 28,'94}}$ this antiseptic has not received the attention it deserves, and many fail to appreciate its true worth, notwithstanding the fact that it is the most powerful germicide known at the present time. Biniodide of mercury dissolved in a solution of sodium iodide does not produce the unfavorable conditions that follow the use of the bichloride. Yet this fact is not generally known, for, at a recent discussion $\frac{2}{\text{Nov.25,'93}}$ the opinion was expressed that the biniodide of mercury entailed the possible risk of iodism in addition to that of mercurialism. In the case of biniodide of mercury dissolved in a solution of sodium iodide, such a thing is impossible, as each is soluble in excess of the other. Thus the soluble biniodide of mercury does not, like the bichloride, form an insoluble albuminate; while the biniodide, unlike the bichloride, is very rapidly eliminated and is not likely to give rise either to iodism or to mercurialism. Frere's chief reasons for calling attention to the biniodide of mercury dissolved in a solution of sodium iodide as a lotion for wounds are as follow: 1. It is easily prepared by the addition of a solution of potassium or sodium iodide to the liquor hydrargyri perchloridi of the British Pharmacopœia until the precipitate which first forms is dissolved. This gives a solution (1 in 1000) of biniodide of mercury in a solution of potassium or sodium iodide. 2. In all kinds of wounds the results are superior to any obtained with other antiseptics. 3. Its value is especially seen in scalp wounds, in which, under its influence, no suppuration had been observed. 4. It saves a great deal of time, trouble, expense, and anxiety to the general practitioner. After the wound is washed with the solution (1 in 1000) it is sufficient to keep lint constantly moist with a solution of the strength of 1 in 2000 applied to the part. Illingworth $\frac{22}{\text{Jan.24,'94}}$ also continues to claim

the superiority of solutions of biniodide of mercury over the bichloride in the treatment of poisoned wounds. Stubenrauch claims [301 B.37,H.5,6,'93] that iodoform is not an antiseptic in the true sense of the term, as is corrosive sublimate, inasmuch as it does not destroy bacteria by short contact. The investigations heretofore made upon several different bacteria have shown that iodoform only inhibited the growth of anthrax and tubercle bacilli. It probably possesses no specific antituberculous effect. Experiments on pure cultures of tubercle bacilli have repeatedly shown that when the iodoform remained in contact for a long time the growth was arrested, but it was not possible to destroy the vitality or growth of fully virulent tubercle bacilli by contact with iodoform in the animal body. The favorable results which follow the iodoform treatment in cases of chronic tuberculous abscesses must not be taken as unconditional proof of the specific antituberculous effect. The bacilli which are contained in tuberculous abscesses die under the influence of iodoform, but it is not proven that the destructive effect is primarily due to the drug. Maurel [80 Nov.10,'93] states that it increases the formation of leucocytes, but does not influence the red blood-corpuscles. Stchégoleff [273 V.6,No.6] finds that it sensibly diminishes the secretion of wounds and increases the resistance of the tissues. N. A. Blagoveshtchensky, of Moscow, [586 No.5,'94] states that his experiments fully support Klein's high opinion of the antiseptic properties of izal. [2 Oct.7,'93] Dressing and suture materials and hands infected with pyogenic streptococci and staphylococci can be sterilized with izal emulsions in a satisfactory manner. The author declares that "even very strong emulsions of the substance are absolutely harmless."

Referring to this paper, P. I. Dïakonoff, of Moscow, [586 No.5,'94] points out that commercial specimens of izal are found to vary in their chemical composition, while another disadvantage of the new disinfectant consists in its being non-transparent.

At the Fourth Meeting of the Association of Military Surgeons of the United States, held in Washington, May 1 to 3, 1894, attention was called to the valuable qualities of trikresol in general surgical work by Walter Reed, U. S. A., [109 June,'94; 80 July 16] who thinks that much credit should be given to Laplace, of New Orleans. While working under Koch, in 1888, Laplace mixed equal volumes of crude carbolic and concentrated sulphuric acids,

and found that he had thereby obtained a dark, syrupy liquid, which was easily soluble in water and which possessed remarkable germicidal power. A 2-per-cent. watery solution of the mixture destroyed anthrax spores in seventy-two hours, whereas a 2-per-cent. solution of either carbolic acid or creolin was absolutely without influence. Here was the first step in the evolution of the germicide which is at present attracting so much attention in Germany. Carl Fränkel's exhaustive review of Laplace's work $\frac{58}{\text{B.6,'89}}$ proved conclusively that the body evolved and brought into solubility by mixing crude carbolic and sulphuric acids was none other than kresol, and not only confirmed Laplace's observations, but also extended them considerably.

Arising from the important work of Laplace and Fränkel, a number of investigations have been carried on, during recent years, in Germany, by chemists, bacteriologists, and surgeons, growing out of the study of these higher homologues of carbolic acid, viz., the kresols. These differ from phenol by having one atom of hydrogen replaced by the methyl group CH_3. Thus, if we represent carbolic acid by the formula C_6H_5OH, that for kresol would be $C_6H_4CH_3OH$. There are three of these bodies, known as ortho-, para-, and meta- kresol. The first two are crystalline bodies, the third appearing as a colorless, thickish fluid whose boiling-point is about 201° C. (394° F.).

Much difficulty has been experienced, heretofore, in obtaining these isomeric kresols in a pure state; but they are now manufactured in a pure state from coal-tar, the three being presented together and happily named trikresol. The latter is a white liquid, of a creasote-like odor, specific gravity 1042 to 1049, and soluble in water to the extent of 2.55 per cent. Its solutions are clear, and, unlike solutions of carbolic acid, do not impart any sensation of numbness to the fingers and hands of the operator. It is also said to be less irritating to wounds than either carbolic or bichloride solutions.

As regards its great value as a germicide, Grüber and Reed bear $\frac{324}{\text{B.17,p.618,'93}}$ strong testimony; 1-per-cent. solution of trikresol kills the pyogenic cocci in watery solutions invariably in half a minute. The same-strength solutions in rich albuminous fluids require one and a half minutes to destroy staphylococcus aureus. Its action is thus seen to be unusually prompt, even in the presence of

albumin, which is an important point in its favor as compared with the older germicides. Finally, its poisonous qualities are rated as slightly less than carbolic acid; but, since 1-per-cent. solutions of this agent accomplish the work of 5-per-cent. solutions of carbolic acid, the danger from poisoning is greatly diminished. O. Liebreich [116 No.1,'94] believes that the drug will become a valuable agent in disinfection.

Formalin, according to Cheesman, [59 Sept.8,'94] arrests the development of germs, even in an already-liquefied culture. Euphorin, in a 1-per-cent. solution, has been found by Colasanti [50 May 25,'94] to possess an energetic action upon bouillon cultures and a feebler one upon dry micro-organisms. Walliczek [50 Jan.9,'94] found that the bacillus coli communis was killed in two hours by a ½-per-cent. solution of tannin, while the anthrax bacillus resisted a 10-per-cent. solution for twenty-four hours. The action of tannin is manifested more by prolonged contact than by concentrated solutions.

Sulphur, in a glycerin emulsion, has been found by Arbuthnot Lane [6 Apr.7,'94] to be equally efficacious in tuberculous affections as in other wounds. Applications are allowed to remain twenty-four hours, and are followed by daily irrigations. C. H. Castle [9 Mar.31,'94] has had excellent results from acetanilid in the dressing of wounds, cure taking place without suppuration. Bodamer [9 Mar.10,'94] finds it superior to iodoform as an antiseptic powder. Permanganate of potassium and oxalic acid have been studied by Mary Sherwood, who states [858 v.3,Nos.7,8,9,'94] that the former, in saturated solution, does not sterilize sutures infected with the staphylococcus pyogenes aureus or albus after immersion from one to ten minutes at a temperature of 45° C. (113° F.). Immersion for one minute in permanganate of potassium and then in a saturated solution of oxalic acid sometimes retards the development of the germs. Oxalic acid sterilizes perfectly, after one minute, at a temperature of 40° to 45° C. (104° to 113° F.). This effect is especially marked if immersion be first made in the potassic solution. Hoffmann [21 Aug.4,'94] finds that boiling instruments in a 1-per-cent. solution of marine salt will sterilize them satisfactorily.

ANÆSTHETICS.

By DUDLEY BUXTON, M.D., B.S.Lond.,
LONDON.

GENERAL CONSIDERATIONS.

The Discovery of Anæsthesia.—It is a somewhat curious circumstance that history made so recently as within the last fifty or sixty years should be so inaccurately known as is the discovery of the application of the narcotics—chloroform, ether, and nitrous-oxide gas—to the relief of pain during surgical operations. Priestley, attracted by the brilliant work done by the Hon. Henry Cavendish in 1765, carefully describes nitrous oxide under the name of "nitrous air."[2143 1779] To the genius of Humphry Davy (1799–1800) we owe our knowledge of its physiological action and the suggestion of its possible employment as an analgesic. He wrote: "As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place." At this point McManus[2144] takes up the thread of the narrative and retells the well-known tale how Horace Wells, seeing Colton give gas for a demonstration at a popular lecture on chemistry, and observing that its inhalation gave immunity from pain, suggested and actually accomplished successful dental operations by its aid. So far all are agreed; unhappily, confusion reigns as we advance from this point into the history of what is justly called one of the greatest discoveries of the century. However, as Colton has indicated,[81 v.20,p.73] after his failure to demonstrate the reliableness of nitrous oxide at Boston, he took no immediate steps to publish his discovery. Ether, known in the Old World as *oleum vitrioli dulce*, was discovered by Valerius Cordus (1515–1544), the author[2145] of the first official dispensatory. The first known reference to its anæsthetic properties is that commonly ascribed to Michael Faraday[2146 1818]: "When the vapor of ether mixed with common air is inhaled, it produces effects very similar

to those occasioned by nitrous oxide. . . . It is necessary to use caution in making experiments of this kind. By the imprudent inhalation of ether a gentleman was thrown into a very lethargic state, which continued, with occasional periods of intermission, for more than thirty hours, and a great depression of spirits; for many days the pulse was so much lowered that considerable fears were entertained for his life." From many sources we learn that ether was inhaled for the pleasure its exhilaratory vapor produced, and in certain circles became the vogue. Grandy [81 v.20,No.7] produces evidence that Crawford W. Long, of Jefferson, Jackson County, Ga., in 1842 performed several operations with the aid of ether narcosis. The Wilhite adventure, when the negro boy was playfully (? save the mark !) dosed with ether and left for dead, seems to have taken place after Long's first operation. Wells also appears to have tried ether with Marcy, who actually operated upon an etherized patient. Other cases are reported as occurring at about this date. However, there seems very little doubt that the first systematic attempt to employ ether in general surgery and the first full ventilation of its efficiency in this direction were made by Morton, and not until October, 1846. Like all great discoveries, that of anæsthesia by inhalation was made by many men and by slow degrees. Morton appears to have received valuable information from others, but to have possessed the faculty of making use of that information, and to him must so much credit be due. To the curious in these matters much information can be obtained from the work [2147] of the Hon. Truman Smith, Hayman's criticism of Grandy's paper, and the reply of the latter. [81 No.235 et seq.] The discovery of chloroform is much less a matter of dispute. It would certainly seem that Sympson was not the first to actually employ chloroform, although undoubtedly the first to demonstrate its value in surgery.

Technique.—In a paper entitled "The Technique of Chloroformization" [80 Mar.15,'94] some curious mistakes are made by the writer, Angel Coutreras, of Puebla, who, like many who are unacquainted with the technique of etherization, compares it, to its disadvantage, with chloroform. Thus, Coutreras speaks of chloroform as acting more rapidly, of its effects being more intense and durable, as producing less excitement than ether; whereas all who are skilled in anæsthetics know that ether acts twice or thrice

as rapidly as chloroform, and that it produces more absolute muscular relaxation, and no more, or even less, excitement than chloroform. Snow, very many years ago, spoke of ether as the more powerful muscular relaxant, and in his day ether was badly given,—a cone being used. At the present day, with perfect methods, better results are obtainable. It is easily to be understood how this more complete muscular paralysis is obtained. Working with chloroform we recognize four stages of narcosis. (See Snow [2148 '58] and Buxton. [2149 p.102,2d ed.]) The first stage, from the commencement of inhalation to the loss of conscious control of the limbs; the second, to the stage of loss of conjunctival reflex and rigidity of the muscles; the third, or surgical stage, when the muscles are relaxed (in the main), the corneal reflex is lost, and the pupil is contracted; the fourth stage, when the medullary centres are affected, the pupils dilate, the respiration gradually fails, the muscles are absolutely relaxed, the sphincters cease to act, while the circulation fails. In the fifth stage convulsions occur, the breathing ceases, and the heart and circulation comes to a stand-still. The complete relaxation of the muscles can, in some cases, be arrived at only by the patient entering the fourth stage, and, in the case of chloroform, such pushing of the anæsthetic can only be accomplished by seriously jeopardizing the patient's life. In the case of ether, however, a patient can, with ordinary care, be allowed to pass into this stage without danger. Again, Coutreras speaks of a "tardy cardiac syncope" under ether. This does not occur. If ether kill the healthy subject at all, it kills by asphyxiation. Passing to less debatable points the author asserts, and truly, that chloroform may kill suddenly at any period of its use; although Sedillot and Gosselin, and perhaps we might add Lawrie, assert that pure chloroform, properly given, never causes death. The continuous-inhalation method was first proposed by Labbé in 1882, we are told; but here the author is manifestly wrong, as Snow, Sanson, Clover, and others used apparatuses for continuous inhalation long before. The writer describes the method—that of Cordero [179 v.25,p.122]—which he appears to approve, as follows: "Sometimes a layer of cotton fixed over a wire screen is used, sometimes Esmarch's apparatus. Usually, however, the simple cone, made of coarse cotton linen, with a sufficiently large aperture on the top to permit of free access of air, is employed.

No cotton or any other material is placed within the cone; this is allowed to remain empty, and it is over the external surface of the cone that the chloroform is poured in small quantities at a time. When the first drops of the liquid are dropped on the cone, this is brought over the mouth and nostrils of the patient, but without touching those parts, in order that the air may find entrance in this way. These first drops produce, upon the linen of the cone, a stain which does not disappear until evaporation has completely taken place; but, before this occurs (which it usually does in the course of a few seconds), new drops of chloroform are poured on. The procedure is continued until the disappearance of the palpebral (conjunctival?) reflexes and complete loss of movement in the patient show that full anæsthesia has been established, when any operation can be performed without pain." Untoward symptoms, if met with, indicate the removal of the mask, and, unless such occur, the administration is carried on as described above. Anæsthesia is produced in from six to eight minutes. No prolonged operation seems to have been carried out under this method; so Cordero's immunity from accidents does not amount to much. Under the title of "Safe Anæsthesia," Hiett [72 May,'94] vaunts the value of strychnine as a preservative against chloroform syncope. He believes that strychnine "is the most reliable, efficacious, and rapidly-acting cardiac stimulant that we have." It is given before the anæsthetic is inhaled, in doses of $\frac{1}{50}$ to $\frac{1}{20}$ grain (0.0013 to 0.003 gramme) or more, hypodermatically.

Various plans have been adopted to obviate the unpleasant symptoms of ether inhalations. Clover's well-known plan of producing anæsthesia by nitrous oxide [2149 2d ed., p.41] is largely used in England. In certain cases, however, this combination proves unsatisfactory. "Tall, muscular men, alcoholic individuals of both sexes, bloated and stout patients with every evidence of cardiac degeneration, asthmatics," and some others take this mixture badly. For these the A. C. E. mixture (alcohol, specific gravity 0.830, 1 part; chloroform, specific gravity 1.497, 2 parts; and ether, specific gravity 0.720, 3 parts), [2150 p.254] followed by ether, answers well. The A. C. E. is given from lint, a cone-shaped towel, one-half drachm being poured on at a time. As soon as the patient is accustomed to the anæsthetic it is given from a leather (Rendle's) mask. Ether from an Ormsby inhaler is substituted as soon as the patient is

anæsthetized, and narcosis is afterward maintained by ether; or the A. C. E. can be given from the first from a Skinner flannel cap and passed straight to the Ormsby inhaler. The use of Clover's inhaler in this succession does not, according to Hewitt, give such good results as Ormsby's.

Magill, [59 Oct.,'93] reviving the practice of Levin, employs bromide of ethyl as an antecedent to chloroform or ether. Terrier, [419 v.18,p.626] who employs this method at the Hôpital Bichât, describes it as follows: The bromide is used in large quantities, 3 grammes (46 grains) being poured on a folded towel placed over nose and mouth of the patient, who is directed to breathe deeply. Generally at the second or third inhalation a slight agitation appears, but at the fifth or sixth the anæsthesia is complete. With the continuance of this anæsthetic, in a moment, sometimes preceded by tonic contracture, the complete muscular resolution is accomplished, with congested face and dilated pupil. At this point the change of anæsthetic is made, but without any break. Terrier's succession appears to be ethyl-bromide, then chloroform; whereas Magill, although using this succession, also employs bromide of ethyl, followed by ether. The advantages claimed for this method are: 1. Rapidity; a complete anæsthesia, which allows the commencement of the operation in one minute's time after the first inhalation. 2. Absence of stage of excitement. 3. Safety. It is said that the physiological actions of bromide of ethyl and chloroform are dissimilar, but this is doubtful. Both are cardiac paralyzants, being compounds of the haloid group (chlorine and bromine) with an organic base, and it is usually held that it is the haloid element (Richardson) which supplies this dangerous quality to the compound. 4. Absence of after-effects, as nausea or vomiting.

Silk [6 Aug.,'94] draws attention to the importance of proper dieting and the dangers of shock under anæsthetics. He regards a very prolonged fast as a dangerous preparation, predisposing to cardiac syncope. He suggests that the patient should, whenever possible, be put upon "hospital regimen" for some days before the operation, and approves the plan of Christopher Heath, that when the operation is likely to be very prolonged the patient should have an enema of hot beef-tea half an hour before the administration. It was at one time believed that "shock" would be abolished by the

use of ether, chloroform, etc. This view is now given up, save by a few. As Silk points out, there still remains some shock, although it is a demonstrated fact that deep narcosis lessens it. Hewitt, [6 Mar.,'94] indeed, considers that, during operations on exhausted and anæmic subjects, light anæsthesia produces less disturbance in the circulatory and respiratory systems than moderate or deep anæsthesia. George Oliver, who has by means of a new clinical instrument—the arteriometer—made some very important researches upon this subject, [2151 '95] has found that "shock," as shown by the phenomena of the circulation, is variously affected by different anæsthetics. He first shows that a diminution of the calibre of the artery accompanies shock, and is the result of a fall in pressure; further, "Ether invariably increases it (the arterial calibre) and chloroform reduces it, the rise and fall lasting, with but slight fluctuations, throughout the administration. Nitrous oxide causes a slight expansion, followed by a reduction either to the normal calibre or to a point or two below it; the latter, however, fails to take place when the gas is inhaled along with oxygen." "I have observed," he says, "that the drop below the normal calibre need not necessarily take place; as a rule, for example, it was not apparent in the cases under the administration of the gas by Dudley Buxton." This after-drop is, in fact, not a result of the nitrous-oxide gas, but rather the partial asphyxia incident to certain methods of administering the anæsthetic,—a complication which can always be avoided. "Inasmuch as I have shown that operative procedures are apt to throw an increased strain upon the heart and great vessels by causing extensive contraction of the middle- and smaller- sized arteries, it would seem to follow that those anæsthetics will be the safest which maintain the heart's action and the fullness of the arteries. I therefore conclude, from these observations, that ether for ordinary surgical work and nitrous oxide with oxygen for short operations best fulfill this physiological requirement, and that, as a general anæsthetic, the A. C. E. mixture is preferable to chloroform."

Selection of an Anæsthetic.—This, in different cases, is often a matter of no small difficulty. Keetley [2 Nov. 18,'93] attempts to get over the difficulty by giving no anæsthetic whatever. His conclusions are: General anæsthesia should, as a rule, be avoided in cases of (1) strangulated hernia in old and exhausted subjects; (2) colot-

omy and colectomy in similar cases, when the course of the operation can be foreseen and planned beforehand; and (3) mere tapping, aspirating, sounding, or even laparotomy by small incision for exploring,—combined, perhaps, with evacuation of fluid (or even of simple, non-adherent cysts?). Keetley also appears to perform prolonged operations for the removal of diseased thyroids with little or no anæsthetic. In criticizing these conclusions, Walter Spencer points out that the patient who is denied the anæsthetic is being punished for the shortcomings of the inexperienced anæsthetist. Probably more care and knowledge on his part would be a better remedy for the mortality than to give up anæsthetics. The very important factor, "shock," has to be carefully considered; for, as already pointed out, Oliver's conclusions show that an anæsthetic does abrogate shock in a great degree. Very many deaths without anæsthetics follow shock during the very operations to which Keetley refers.

A very just contention $^{80}_{\text{Oct.13,'93}}$ is that the routine employment of any one anæsthetic leads to mishap; each case has to be decided upon its own merits.

In special discussions held before the Laryngological Society of London $^{2}_{\text{Apr.21,'94}}$ and the Society of Anæsthetists $^{6}_{\text{Mar.24,'94}}$ the following conclusions were arrived at: Operations for the removal of post-nasal adenoid growths should be conducted under general anæsthesia. In very simple cases nitrous-oxide gas simply, or combined with oxygen, might prove sufficient; but for more prolonged cases—such, for example, when both tonsils and growths require removal or the growths are too scattered or too tough for rapid operations—either ether or chloroform is required. Dudley Buxton, who opened the discussion, emphasized the fact that chloroform should never be employed unless the recumbent posture is used. In other cases he used gas, followed by ether. It was alleged that ether produced more hæmorrhage, but he said that this was only true when the patient's blood was allowed to become overcarbonized. In many cases chloroform was advisable either quite from the first or as a succession to gas and ether, when it could be pumped over through a metal mouth-tube connected with a Junker apparatus. Hewitt advised the patient's being placed on his side, either during or at the end of the operation, so that the blood could flow out of the mouth. Woodhouse Braine

preferred to place the patient in a semi-recumbent position and, as soon as the operation is commenced, bent forward so that the trunk is forcibly flexed on the thighs, thus bringing the mouth over the knees. The consensus of opinion was that the *degree* of anæsthesia should in no case be such that the laryngeal and pharyngeal reflexes are abolished. Many of the deaths occurring during these operations are due to the ingurgitation of blood into the air-passages. Charles Parker [2152 p.84,'94] says: "The risks from chloroform are very slight." He recommends placing a gag, unexpanded, in the mouth before the anæsthesia has commenced, gradually opening it as the inhalation proceeds, with the view of obviating the stridor and dyspnœa which occur in such cases, owing to the mechanical interference with air passage. "In this way anæsthesia can be produced more evenly and rapidly, and the danger of laryngeal spasm is diminished." Parker further insists upon rapidity in operating, so as to lessen the danger of blood entering the air-passages or traversing the Eustachian tubes. To the same end he removes the gag as soon as possible, as a mouth fixed open induces more hæmorrhage. Turning the patient on his side rapidly empties the naso-pharynx of blood.

In valvular heart disease, as Giffen [1 Oct.,'93] very truly points out, anæsthetics are by no means contra-indicated. In aortic insufficiency he enjoins the necessity of studying heart-rhythm and arterial pressure, and asserts that, "so long as the rapidity of the heart's action does not disturb the rhythm—viz., first sound, second sound pause—within reasonable physiological limits, or, in other words, the arterial pressure, composed of the time (rapidity) and intensity (muscular impulse), does not overcome rhythm," the anæsthetic can safely be given.

Dealing with the effects of anæsthetics upon the general metabolism of the body, Kiefer [185 Jan.,'95] points out that ether and chloroform, by displacing oxygen in the respiratory passages, eventually paralyze the various nerve-centres, last of all the medullary ones presiding over respiration and circulation. [This is not supported by any fresh experimental evidence, but arrived at by *a priori* reasoning. The analyses of blood made by Oliver and Garrett [6 Sept.9,'93] show that chloroform does lead to deoxidation of the blood and tissues of the body.] A general malnutrition results, as well as an imperfect formation of products of tissue-waste. Thus,

extra strain is imposed upon the whole organism, and especially upon the glandular system. The failure to eliminate excretory products which occurs, in part due to the injurious effects produced upon the epithelium of the excretory organs, accounts, he thinks, for some of the deaths ensuing some days after the administration of an anæsthetic. This theory is of interest in connection with certain views advanced by Guthrie, [6 Jan.27,Feb.3,'94] who draws attention to deaths occurring in children some days after taking chloroform, presumably due to the anæsthetic. Casper, Behrend, Langenbeck, and other authorities are quoted to show that chronic chloroform poisoning does actually occur, and it is concluded (1) that such deaths are due to auto-intoxication; (2) that a fatty condition of the liver, and therefore functional disturbance of the organ, existed before the anæsthetic was given; (3) that chloroform and operation shock combined aggravated the condition already present, and thus loaded the urine with alkaloidal bodies which the kidneys were unable to eliminate. It is supposed that lessened oxidation, such as some believe ether and chloroform cause, leads to deposition of fat in the liver and elsewhere, and so would prevent fat being oxidized on its way from the liver into the general circulation. Further, Ungar and Strassmann, Thiem and Fischer, [41 p.4,'89] and Ostertäg [20 v.118,p.2] have experimentally shown or observed (1) that there are present fatty degeneration of organs, especially fatty infiltration of the liver and fatty changes in the cardiac and skeletal muscles, kidneys, and stomach; (2) that these fatty changes arise from the action of chloroform upon the blood-corpuscles and tissue-cells; (3) that some individuals show a greater susceptibility to these effects of chloroform than others; (4) that death is due to cardiac paralysis, with occasional fatty changes in the myocardium and carbonization of the blood. The practical conclusions derived from these facts are worth notice: (1) chloroform is contra-indicated in all cases of fatty liver; (2) when this condition is not discoverable by clinical evidence, the fact that the liver-function is hampered,—as shown, for example, by alkaloidal bodies in the urine,—should be taken as contra-indicative to chloroform. Poehl, of St. Petersburg, is quoted by Lauder Brunton [2153 v.6,p.147,'94] as stating that by examining the urine of patients before taking chloroform he could tell whether they would have any troublesome symptoms. When an excess of alkaloidal

matters were present in the urine there was a tendency to cessation of respiration which did not occur when the amount of alkaloid present was slight.

CHLOROFORM.

Rockwell, [59 Feb.,'94] dealing with the action of electricity on the pneumogastric nerve during chloroform narcosis, comes to the conclusion that the inhibiting fibres going to the heart are less affected than the accelerator nerves. The beneficial effects of the faradic current are due not to any action it has on the heart's rhythm,—since, as von Ziemssen has shown by cardiographic tracings, the induced current has absolutely no effect upon the frequency or force of cardiac contractions,—but to its stimulating influence over respiration. The strength of the current employed to produce this effect on respiration is much less than need be used if a cardiac stimulation is aimed at, and it is probably to this fact that the apparent nugatory effect on the myocardium is due, even when breathing is strongly affected. Struggling under chloroform—which is by most persons looked upon as a danger—is, according to Lawrie, [6 Jan.20,'94] produced (1) by fright, leading to purposeful resistance; (2) by choking or asphyxia from over-concentration of the vapor, owing generally to the cap being held too close to the face at first or afterward when the chloroform is being renewed; and (3) by intoxication, *i.e.*, the so-called "struggling stage." Fright or voluntary struggling he regards as free from danger, as it leads to even and deep inspiration, crying, screaming, and further abrogates, as a rule, "intoxication struggling." Regard must, of course, be had to the fact that the deep inspirations which occur when crying or conscious struggling is present will lead to an increased intake of chloroform, which should be guarded against.

The struggling of intoxication (true "struggling style") is dangerous. The breathing is then irregular and the amount of chloroform in the circulation is considerable, anæsthesia being nearly complete. The inhaler should be removed from the face for a few respirations, which does not necessarily cause a break in the narcosis, as chloroform still remains in the air-cells; and as soon as respiration has resumed its normal character, the chloroform is re-applied. Asphyxial struggling, usually due to insufficient dilution, is extremely dangerous. It leads to gasping

and deep inspirations, and is the frequent cause of overdosage. Air must at once be admitted and no more chloroform given until all cyanosis has disappeared; "the respiratory centre, when it is asphyxiated, is peculiarly susceptible to and difficult to rouse from the narcosis of chloroform."

Joseph White $_{\text{Mar.,'04}}^{22}$ calls attention to the condition of the pupils during chloroform anæsthesia. Until the loss of conjunctival reflex they remain moderately dilated, but contract when anæsthesia is complete (during third stage). This condition he regards as the analogue of normal sleep, in which the behavior of the pupils corresponds with what obtains under chloroform. The eyeball also becomes fixed in deep anæsthesia. This condition of anæsthetic "sleep" may be maintained. The renewed movement of the eyeball and dilatation of the pupils indicate the returning of consciousness. Stertorous breathing, with fixed eyeballs and dilating pupils, means the fourth stage of anæsthesia, and the supply of chloroform must at once cease, while every endeavor is employed to maintain due respiratory movements.

Arthur Ward $_{\text{July 28,'04}}^{6}$ likewise regards the eye as a valuable guide in chloroform narcosis. At first the pupil is dilated and active, as also in incomplete anæsthesia, going under or coming round. This dilatation is due, he believes, to mental, sensory, or sympathetic impulses affecting the semi-narcotized cerebrum, and so giving rise to reflex inhibition of the centre of the third nerve, and the activity is due to the fact that the centre itself is not narcotized. In complete narcosis the contracted pupil is due to the complete subjection of the cerebrum, while the unopposed third-nerve centre remains active, all cerebral reflexes being now barred. In profound narcosis the third-nerve centre itself becoming poisoned, its action no longer controls the pupil, which dilates and grows less and less sensitive to light, while the globe becomes fixed. This fixation of the eyeball, together with the stertor of breathing and the sluggish pupils, forms the contrast between the fourth, or danger, stage of chloroform sleep and the second stage, when dilatation of the pupil is associated with shallow breathing, efforts at vomiting, pupils reacting to light, and return of conjunctival and other reflexes. The period of going under is, Ward thinks, the one of most danger. The patient then, by

holding his breath, debilitates the respiratory centre by cutting off its oxygen-supply, and so predisposes it to injury by any access of strength of the chloroform-vapor.

Warnots [868 Feb.2,'94] enumerates the following procedures in chloroform syncope: 1. Artificial respiration by Howard's, Sylvester's or Tchüller's methods. He gives the important caution that each method should be carried out most carefully in detail and persisted in for at least an hour. 2. Electrical stimulation of the phrenics by placing electrodes by the side of the neck, just outside the insertion of the sterno-mastoid muscle. 3. Direct electropuncture of the heart,—a measure which he does not advise. 4. Laborde's method of rhythmic traction upon the bougie. The mechanism of this plan and its physiological explanation were pointed out many years ago by Sir Joseph Lister.[2154] 5. Rhythmic percussion of the cardiac area, as proposed by Maas. Bobroff [113 No.52,'92] suggests the use of artificial prepared serum in cardiac syncope due to chloroform, experiments on the lower animals and man leading him to regard the method as valuable. He injects subcutaneously 20 or 25 cubic centimetres (5 to 6½ fluidrachms) from a sterilized syringe into the shoulder or thorax, pressing the injection into the tissues. This is repeated as is necessary.

Richardson [692 Apr.28,'94; 1 May 19,'94] writes against electrical stimulation of the heart, believing artificial respiration to be the only reliable means for resuscitating those overdosed with chloroform. The heart's action may be seen in three grades of motion: (*a*) that which obtains in its full vital action when its propulsive power is normal; (*b*) a less vigorous propulsion occurring in unconscious life,—*e.g.*, catalepsy, syncope, anæsthesia; (*c*) passive auricular and ventricular contraction incapable of effecting circulation, which obtains in respiratory stand-still, in collapse, and chloroform toxæmia. This is akin to the *delirium cordis* of MacWilliam. The heart in this third condition is reduced in volume and, further, contains very little blood. The lungs shrink, owing to the action of the elastic tissue, and so actually interfere mechanically with the maintenance of pulmonary circulation,—an effect increased by the elastic resistance of the pulmonary artery itself, imposing a barrier to the passage of blood into the lungs. Thus, it would appear that circulatory and respiratory failures are, in most cases, correlative conditions. From

actual experiment it may be seen that the proper performance of artificial respiration will enable the heart to pass from the third to second and thence to the first condition mentioned (*c* to *b* to *a*).

Whether artificial respiration will or will not succeed depends upon several circumstances: (1) the time which has elapsed since apparent cessation of vital action in the lower animals, even after seven minutes' restoration has occurred; (2) a high temperature which favors clotting in the pulmonary circulation; (3) extreme cold; (4) rough movement; (5) inexpert artificial respiration may give the *coup de grâce* to the enfeebled heart. He regards both Sylvester's and Marshall Hall's methods as injurious for this reason, and affirms that quick, gentle emptyings of the air from the lungs, laden as it is with chloroform, are most to be desired. To this end he employs mouth-to-mouth insufflation. The obvious objection to this method is met by an apparatus invented by Richardson. It is a double-acting hand-bellows, made of rubber, which is exhausted by one bulb and filled by the other. In the absence of this an ordinary bellows can be used, the nozzle placed in one nostril while the other, as well as the mouth, is closed. The air is sucked out of the lungs by expanding the bellows, and by compressing it the chest is filled. It is not necessary to imitate the natural efforts at respiration; the more gentle the movement of suction and insufflation, the better, and eight or ten of each should take place in each minute.

The statistics of the German Surgical Society on the subject of anæsthetics, according to Gurlt, $\frac{41}{\text{May 31,'94}}$ were collected from 58 reports received from Germany and 9 from other sources. The whole number of cases in which anæsthetics were given is 51,846; of chloroform, 32,725; ether, 11,617; mixture of chloroform and ether, 3896; Billroth's mixture, 750; bromide of ethyl, 2769. In all there were 20 deaths,—a mortality of 1 in 2587; but 6 other deaths have to be added to this list, having been more or less due to an anæsthetic. Chloroform caused 17 deaths in 32,725, *i.e.*, 1 in 1924. Taking the figures of the past years (four in all) during which returns have been obtained by the society, there is an average of 1 death in 2645 administrations of chloroform; 1 death in 8014 of chloroform and ether mixture; 1 in 4890 of Billroth's mixture (chloroform, ether, alcohol); 1 in 26,268 of ether. Albuminuria is reported to have occurred four times in 196 cases in

which the urine was examined, and twice in 56 cases of ether narcosis. Gurlt draws attention to the increasing death-rate under chloroform, though H. V. Bardeleben has never had a death during nineteen years, and Wagner only 1 death out of 16,000 cases. Witzel, of Bonn, [69 Aug.,'94] after carefully describing the technique of anæsthesia as conducted in some German clinics, emphasizes the importance of the work of the anæsthetist. Too often, as he says, while the surgeon particularizes the details of the pathological lesion to be dealt with and the steps of the operation to be carried out, he pays but little attention to the fitness of the patient for the anæsthetic and to the selection of the narcotic and the method by which it should be employed.

The value of sparteine as an adjuvant to chloroform is vouched for by Langlois and Maurange. [55 No.28,'94] It regulates the heart's action and lessens the tendency to syncope and depression. They advise the injection of ½ to ¾ grain (0.03 to 0.045 gramme) of the sulphate of sparteine with morphine ⅛ grain (0.008 gramme) fifteen minutes before the inhalation. Sparteine appears to lessen pneumogastric excitability, and so is believed to lessen the risk of secondary syncope, while morphine lessens that of the primary syncope, so fatal at the commencement of the inhalation.

ETHER.

Chalot [91 May 10,'94] regards ether as *the* anæsthetic of election, but points out the necessity for studying each case upon its merits and deciding what anæsthetic will prove best. Ether is incontestably safer than chloroform at the time of the operation. Subsequently its perils are supposed to arise (1) from the lungs, (2) from the kidneys. In the case of persons free from renal or pulmonary disease, ether never causes any kidney trouble; and, although a very prolonged administration may produce slight bronchial catarrh, it never causes pneumonia. In the case of persons with bronchial or pulmonary disease, ether does act as an irritant and may set up even fatal pneumonia. In renal disease he regards ether as no more dangerous than chloroform; so that, if we exclude bronchitis and active pneumonic diseases, all persons who take ether are free from liability to those after-effects so commonly, but the writer believes erroneously, imputed to the drug. He even goes farther in considering chloroform even more dangerous in

this respect, since, according to Lindh, [3 p.351,'93] Nicolaysen, Lassen, Ask, and Chalot himself, the action upon the heart is not at all confined to the time of administration, but reveals itself some time afterward. Chalot thinks vomiting less likely to occur and to be less severe and less persistent with ether. Julliard, Stelzner, and Iversen also find this to be the case. As to the depression of temperature which occurs under ether, it has been shown by Kappeler that this amounts to 0.53°, while a fall of 0.52° occurs when chloroform is given,—an almost inappreciable difference. Cough occurred in 4 per cent. of Chalot's cases, but always disappeared when true anæsthesia supervened. He gives the following as contra-indications to the use of ether: 1. Acute inflammation of any part of the respiratory tract, including pleurisy. 2. Chronic disease of the bronchi or lung. 3. Presence of a goitre. 4. Operations on the face or neck. 5. After tracheotomy and the use of Trendelenburg's tampon-cannula. 6. Use of the actual thermo- or galvano- cautery. 7. When the operation has to be done in small, badly-ventilated rooms, he prefers a local anæsthetic, *e.g.*, cocaine. Micheli, of Bologna, [59 May,'94] comes to practically the same conclusions with regard to ether. Wunderlich [333 No.16,'94] and Alber and Rindskopff [333 No.3,'94] deny that ether produces deleterious effects on the kidneys. Wunderlich found, in cases of pre-existing albuminuria, some increase in the amount of albumin excreted after the inhalation of ether. In an important discussion on anæsthetics at Lyons a number of speakers emphasized the safety of ether, and Lépine [211 July,'94] insisted that if pure ether were employed there was little or no danger of pulmonary complications. Aldehydes so commonly present are, he considers, a source of danger.

The suggestion made some time ago, to dilate forcibly the sphincter ani in cases of toxæmia from an anæsthetic, has recently received confirmation. [192 Mar.,'94] The sudden dilatation of the sphincter is followed by a gradual return of natural respiration. Similar effects are said to follow peripheral counter-irritation, applied by inserting a roll of bibulous paper, soaked in ammonia, into the nostrils.

Dundas Grant, [11 Feb.,'94] who refers to the ease with which nitrous-oxide gas, or that anæsthetic coupled with ether, can be employed during removal of the tonsils, post-nasal adenoid growths, etc., suggests the following simple plan of keeping the patient from

slipping out of the chair: A short jack-towel, with the seam unstitched, is placed round the back of the patient's neck like a priest's stole, with the ends hanging down in front. Each of these ends has firmly attached to it about two feet of soft, thick cord or thin rope. He is then seated on a chair which has a very narrow, high back, on the posterior surface of which, and at about the level of the patient's head, there is a stout upright hook. The middle of the jack-towel is raised off the patient's neck, lifted over the back of the chair, and laid on the hook. The two ends are then brought backward under the armpits and round the back of the chair. The ropes are then crossed over the hook and tied in a bow. A band may be passed round the forehead to keep the head fixed. The patient can be instantly released by pulling the ends of the ropes forming the bow.

Vallas, $\frac{211}{\text{June 24,'94}}$ in recording a case of death under ether, opens up a discussion as to which anæsthetics are safest for operations for the relief of strangulated hernia. In his case the patient died through a considerable quantity of the liquid contents of the stomach having passed into the trachea and lungs. Tracheotomy was performed and the fluid drawn off, but the heart failed. Gangolphe, who had met with a similar experience, pointed out that, the less the depth of the anæsthesia, the less the risk of the stomach-contents getting into the lungs. Poncet, $\frac{996}{\text{July 10,'94}}$ after an experience of twenty thousand cases of etherization, regards ether as far safer than chloroform. When dangers arise under its use, they are ushered in by definite signs; further, such dangers occur among the debilitated, not among the healthy and vigorous, as with chloroform. He, however, restricts its use to persons under 14, and not past middle life, and those who are free from pulmonary disease. With these conclusions Tschmarke agrees. $\frac{814}{\text{Apr.14,'94}}$ Poncet thinks mixed anæsthesia, especially morphine and atropine with a general anæsthetic, highly dangerous. S. Suderbaum, $\frac{996}{\text{May 25,'94}}$ on the other hand, gives sulphuric ether to infants and has seen no ill effects. He would employ it in all cases save for operations in the mouth or about the face. Körte $\frac{5}{\text{July,'94}}$ has convinced himself that no form of chloroform is free from danger, but that ether is not only free from immediate peril to life, but produces less after-sickness, and is seldom the cause of inflammatory lung trouble. Hewitt, $\frac{1077}{\text{Nov.,'93}}$ however, contests this as far as vomiting is concerned,

and asserts that both it and nausea are more common with ether, although he believes it to be less persistent. He concurs as to the absence of inflammatory disease after ether.

Hugo Michealis [116 July,'94] and Grossmann [69 May 24,'94] treat carefully of the technique of etherization. They employ the Wanscher inhaler or a modification. The ether in a glass bottle has air passed through it, and the vapor is conveyed to the patient's face by a tube ending in an ordinary face-piece similar to that used by Clover. The arrangement is very similar to Junker's chloroform-inhaler. Ziegler, [336 July 28,'94] who uses Julliard's mask as modified by Dumont, speaks well of that apparatus; but apparently none of these observers are aware of the more perfect instruments of Clover. Dreser [116 Aug.,'94] dwells upon the importance, in any ether-inhaler, of there being a provision by which the percentage of air to ether can be regulated. This cannot be obtained in the ordinary cone or towel. Kaplan, [530 No.7,'94] in using ether with Julliard's mask, has never seen any renal complications occur. Heinrich Fritsch [317 Sept.1,'94] contends that ether is the best anæsthetic for gynæcological operations. In cases of patients suffering from uterine polypus with flooding it is much safer than chloroform, as there is a peculiar danger of syncope in the anæmic when chloroform is inhaled.

MISCELLANEOUS.

Bromide of Ethyl.—In a report [10 June 19,'94] on a death under this anæsthetic, it is stated that the patient, aged 31, took 8 grammes (2 fluidrachms) from a handkerchief and complained of feeling suffocated. The respiration grew stertorous, and after a slight convulsion entirely ceased and the heart failed. Death occurred in ten seconds, with cyanosis, turgescence of the veins, widely-dilated pupils, and upturned eyes. The horizontal posture was adopted. Analysis of the drug proved its purity. Laborde regards the death as a reflex syncope from irritation of the nasal mucous membrane by the vapor. Terrier [55 May 12,'94] states that the bromide of ethyl usually employed for anæsthetic purposes is made with phosphorus, bromide, and alcohol, and gives off phosphoretted hydrogen,—a dangerous impurity. The drug prepared from sulphuric acid, ethylic ether, and potassium bromide, as in commerce, is purer and, as it contains a larger amount of ethylic ether, is much safer than the other variety. Bazy [1 June 9,'94] believes that most

of the unfavorable symptoms, such as vomiting, are due not to the bromide of ethyl, but to the impurities too often associated with it. It may be mentioned [80 Aug.15,'94] that Laborde's method of rhythmic traction on the tongue was unsuccessfully tried in the fatal case just quoted. Reiss [100 May 15,'94] reports a case of death from acute yellow atrophy of the liver, which occurred in a healthy male seven days after inhaling chloroform following bromide of ethyl. The operation was brief, the anæsthesia marked by some asphyxial symptoms, and followed by severe vomiting for three days. A marked alliaceous smell persisted up to the time of his death.

Pental.—H. Rüth, [317 Apr.14,'94] after many experiments, has come to the conclusion that pental is not a dangerous anæsthetic. He admits that caution must be used in inferring that results obtained from the lower animals apply with equal force to man. Of 2131 cases 3 were failures and in 4 clonic spasms were met with, and, not infrequently, cyanosis and some degree of asphyxia. Respiration failed before cessation of the heart's action, while the pupils dilated and the eyeballs became fixed.

Carbon Tetrachloride.—Laborde [814 Sept.1,'94] believes that the chemically-pure tetrachloride of carbon may be employed as an anæsthetic with impunity. Its vapor is odorless, non-inflammable, and non-irritating, and in the lower animals produces sleep. Laborde finds that it produces an increased reflex medullary excitability, and in this respect resembles chloralose.

Cocaine.—Caracatsanis, [805 Sept.,'93] in dental work, paints the gum with a solution of phenic acid (1 in 500), then applies cotton-wool soaked in cocaine, dissects the gum away from the tooth, and applies fresh cocaine pledgets. Finally, he uses a spray consisting of chloroform, 25 grammes (6½ fluidrachms); sulphuric ether, 40 grammes (1¼ fluidounces); menthol, 3 grammes (46 grains); cocaine, 1 gramme (15½ grains); and essence of mint, 1 gramme (15½ minims).

Réclus [17 Feb.17,'94] has had 2250 successful cases by his method, but admits certain contra-indications to the use of cocaine. Huchard warns against its employment in angina pectoris, and Regnier records a fatal case in the practice of a dentist who injected cocaine into the gums of a patient who was the subject of morbus cordis. Cocaine is contra-indicated in brain-lesions of long standing, in severe pulmonary cases, in neurasthenia, and in epilepsy.

Réclus has never used it for children below 6 years of age. We fully described his injection method in the last ANNUAL.

Mayet [211] June 17,'94 employs the following as a local anæsthetic, especially in painful states of the womb, applied on a sterilized sponge or tampon: Petrovaselin (sterilized by boiling), 200 grammes (6½ ounces); iodoform, 10 grammes (2½ drachms); cocaine, 2 grammes (31 grains); oleic acid, 8 grammes (2 drachms).

Létang [212] Apr.10,'94 injects the following freezing mixture from a Pravaz syringe, obtaining, by interstitial injections, a very low temperature: Boiled distilled water, 200 grammes (6½ fluid-ounces); pure glycerin, 100 grammes (3¼ ounces); sulphuric ether, 6 grammes (1½ drachms). The syringe itself can be cooled to 10° C. (50° F.) by a jet of carbonic acid or chloride of methyl.

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By N. I. DEVEREUX,

PARIS.

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